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In This Issue—*Busses from the Dealers' Viewpoint*

MOTOR AGE

Vol. XLII
Number 8

PUBLISHED WEEKLY AT THE MALLERS BUILDING
CHICAGO, AUGUST 24, 1922

Thirty-five Cents a Copy
Three Dollars a Year

Here's a thought for every man
who makes his living selling
motor cars—

The open car is more of a luxury
now than the enclosed car. It
is completely satisfactory for
only three months of the year.

The enclosed car is a necessity
the year 'round.

Edward S. Jordan

Entered as second [illegible] Sept. 19, 1899, at the post office at Chicago, Ill., under Act of March 3, 1879.

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BENCH DRILL STAND WITHOUT DRILL

$33.00

BLACK & DECKER SPECIAL HALF INCH DRILL

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ILLUSTRATION SHOWS BENCH DRILL STAND *with* BLACK & DECKER SPECIAL ½" DRILL

COMPLETE AS SHOWN

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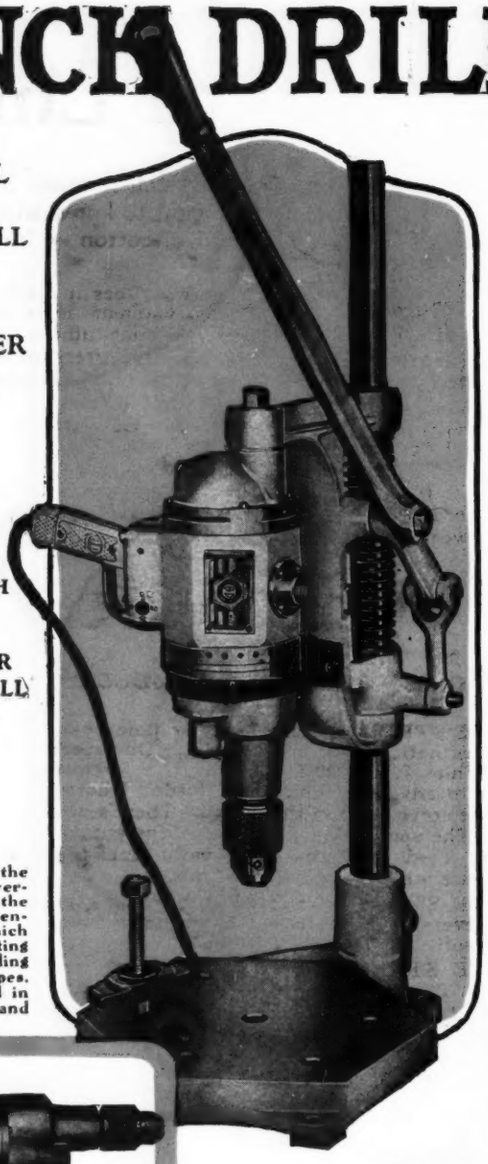
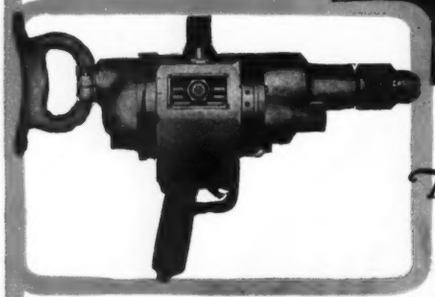
The bracket supporting the drill may be raised or lowered to suit the height of the work and may be swung entirely around the post, which is a big advantage in locating the hole and for handling large jobs and odd shapes. The bracket is secured in position by means of a hand screw.





YOU can always tell a good mechanic by his tools. He never buys inferior tools because they are cheap, if he can avoid it. But if he is a good business man as well as a good mechanic he guards against unnecessary expenditures.

In most shops a portable electric drill is absolutely indispensable and a drill press often necessary. Good mechanics everywhere are using Black & Decker Portable Electric Drills; and to make it possible for them to have the advantages of a drill press at minimum expense we have produced the Black & Decker Bench Drill Stand.

The Black & Decker Portable Electric Drill can be mounted in this stand in a few seconds and dismounted just as readily. The Stand sells for only a fraction of what it would cost to install a drill press.

The Black & Decker Post Drill Stand is similar in all respects to the Bench Drill Stand except that it has a longer column and is arranged with brackets so that it can be mounted on wall or post and the drilling table is secured on the vertical column with a hand screw so that it can be raised or lowered or swung around.

Be sure to see the Automotive Equipment Association "Shop Profits" Film at your First Opportunity.

Guaranteed by

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This is the new Black & Decker Special Half Inch Drill, which has created such a sensation in the trade by reason of the fact that it combines Black & Decker quality and an exceptionally low price.

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BLACK & DECKER NATIONAL CREDIT SERVICE enables any reliable person in the United States or Canada to purchase BLACK & DECKER equipment on terms that will enable the equipment to pay for itself.

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"The Well-Equipped Shop Gets the Business."

MOTOR AGE

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HELP YOUR CUSTOMERS

—and Make Friends as well as Profits

When you show a customer how to remove carbon the easy way — out the exhaust — with Johnson's Carbon Remover, both of you profit. You make a profit on the sale of Johnson's Carbon Remover and he saves $3.00 to $5.00 over any other method of removing the carbon from his motor. And you gain a friend and satisfied customer.

JOHNSON'S CARBON REMOVER

is a harmless liquid that contains no acid. It has no action on any metal and does not affect lubrication.

The use of Johnson's Carbon Remover every 500 miles keeps motors running quietly and full of "pep". A pint can will clean out a four cylinder motor twice. If necessary, the car owner can apply it himself.

You can make big profits and satisfied customers from a small investment in Johnson's Carbon Remover.

Recommend it to your customers and they will recommend you to their friends as a dealer who helps them avoid trouble and unnecessary expense.

S. C. JOHNSON & SON

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'23 Prices

Oldsmobile 1923

PRICES

Effective August 1, 1922

The Light Eight

5 Pass. Touring	*$1495*
Roadster . .	*1495*
Super Sport .	*1725*
Coupe . . .	*1995*
Sedan . . .	*2145*

The Four

5 Pass- Touring	*$1095*
Roadster . .	*1095*
Semi-Sport .	*1225*
California Top	*1395*
Coupe . . .	*1595*
Sedan . . .	*1745*

The Larger Eight

7 Pass. Touring	*$1735*
6 Pass. Touring	*1850*
4 Pass. Pacemaker	*1735*

Oldsmobile 1923 prices are lower! They represent an opportunity to car buyers that the public has not been slow to recognize. With the public buying Oldsmobiles faster than ever, with the public trend now definitely in favor of the new Oldsmobile cars, the value of an Oldsmobile dealership daily becomes greater. There are available dealer territories. Write, wire or phone us for definite information concerning them and for an appointment if you desire it.

OLDS MOTOR WORKS LANSING, MICHIGAN
Division of General Motors Corporation

OLDSMOBILE

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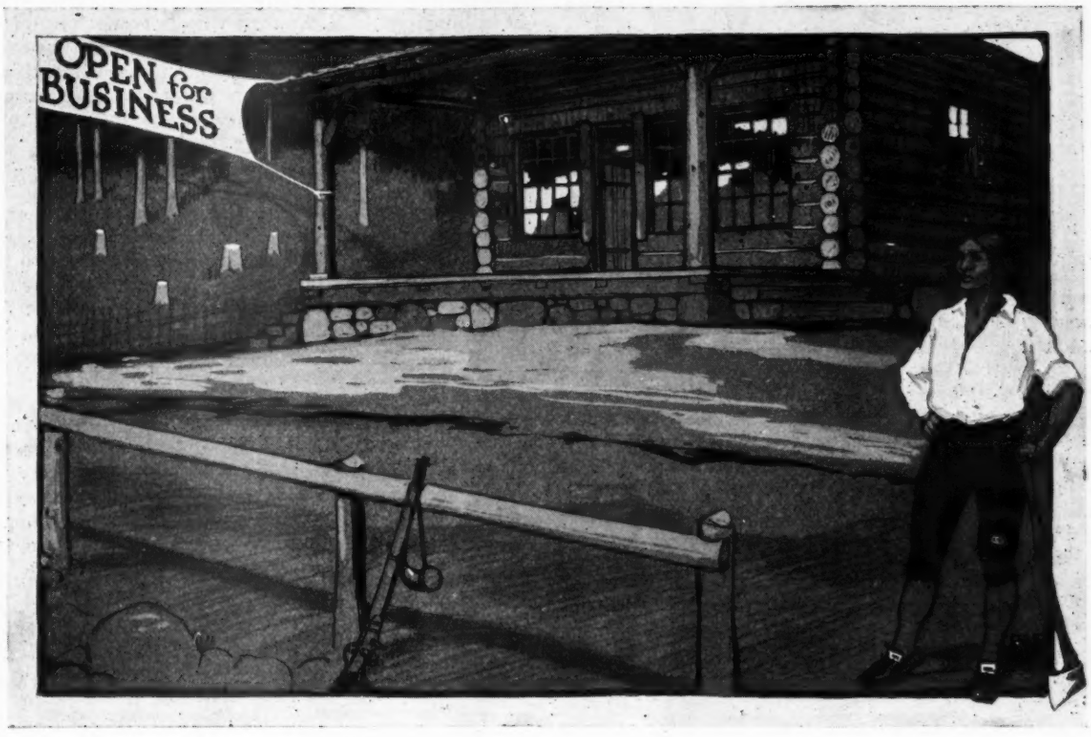
MOTOR AGE



Some Beginners' Suggestions That May Apply to Old Timers

Fundamental Merchandising Principles That Will Help the Dealer Get a Proper Perspective of His Course

By CLYDE JENNINGS

AFTER a man has decided to go into the mercantile business and gets a stock of goods, the question very often is raised as to whom he is going to sell and how is he going to let these people know that he is going to sell them.

The very wise prospective merchant decides these questions in advance. There are many professional merchants who make a very good living by hunting a place for a store, then deciding what they can best sell in that neighborhood, how they can notify the people and other details of that kind before they order the stock. Finally, they open a store, succeed and then sell to some good merchant who lacks sufficient initiative to be able to successfully establish a business.

In the main, automotive merchants have gotten into this business largely by chance. Very often they have merely decided that they wanted to sell automobiles because they knew a man who had "made money doing it." These men, after this decision, have cast about for a car to sell, found one, taken the local representation, opened a store in some vacant building and waited for the people to come and buy

the car. Often the people came, and later a maintenance department was added. The high tide of favor for the automobile has carried many of these men to success.

Another class of men have come into the business by first making a success of a maintenance or accessory business and finally taking on the sale of a car that they believed in and

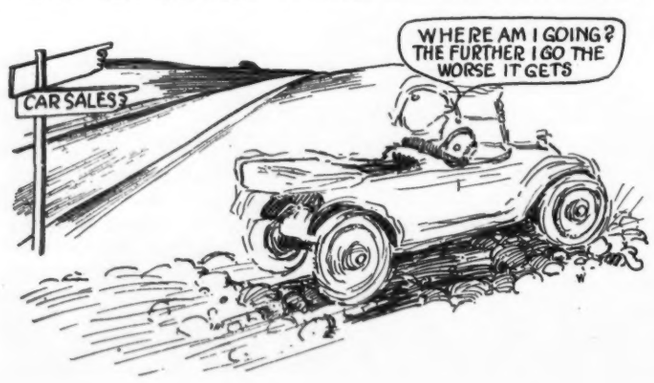
which they believed would sell in their community. If these men lack any fundamental in common, it is a belief in proper display and location. They are too apt to lean heavily on their maintenance department as their mercantile support. A maintenance department is an excellent support for a sales business, and it is growing in importance as car owners generally begin to realize that it is with the dealer they have their contact rather than with the factory. But a shop can hardly carry the load of a sales promotion effort unaided. The dealer owes it to his merchandise to properly display and promote it.

What has been said above refers chiefly to the dealers in passenger cars. The same applies in principle to every dealer —whether he is just starting in the maintenance business, accessories, cars, trucks, tractors or motorcycles. The principles and causes of failures of business are much the same, regardless of the commodity handled or the daily turnover.

The chain stores which are making such a notable success in the mercantile world have shown the way in many particulars. Of course the chain store is never bothered about what it will sell. That is settled in advance. The great point in locating a chain store is to find a place where the articles of trade sold have a market. Next comes the location, and this is quite an important point with them. So important that counts are made of the people who pass the location under consideration. Next comes the estimate of the locality as to spending inclination, then the ability and popularity of the competing merchants.

All of these things are duly considered and weighed, regardless of the fact that the owners of the chain stores usually have ample money to fight a stiff battle to gain recognition.

These suggestions are worthy of consideration by the man who is going to come into the automotive dealer field, or by the man who is already in it and is meeting only with a half-hearted success, it might be worth his while to look around



and see if it would not be cheaper for him to back up and change his line, rather than to persist in his present course. Some things to be considered in opening or continuing an automotive dealer business might be listed as follows:

What shall I sell?
Where shall I sell it?
How shall I begin?
How shall I insure the future?

There are many men in business who have not answered these questions satisfactorily to themselves. They admit that they opened for business without a proper preparation, but they keep on going, although they know they are on the wrong track.

That is a serious and costly mistake. Once a man realizes that he is on the wrong track he should turn the switch and get right or he is very likely to crash into a wreck. The questions set forth here are just as important to the man who is in business as to the man who is going into business. None of us can be sure, from year to year, that we are on exactly the right track unless we "stop, look and listen" and ask ourselves some very searching questions. An inventory as to methods is just as necessary as an inventory of stock, and sometimes a whole lot more profitable.

What Shall I Sell?

No one can decide for the merchant whether it is more important that he shall decide first what he shall sell or where he shall sell it. So much of the answer to this question depends upon the individual. Some men have it so firmly fixed in their minds that they want to sell or do a certain thing that it would be business suicide for them to undertake to do anything else. To these men, the question of where is paramount.

Most men, however, submerge convictions to prosperity, at least until a moral question is involved. With these men the question of the exact nature of the stock is secondary.

If the man has made up his mind absolutely that he can never be happy until he is a dealer in Runwell cars, this part of the article will not be of interest to him. But if he is one of that much larger class of men who is sure that

his future happiness and prosperity is wrapped up in the automotive business, he has this question to decide.

First of all, it is necessary to a man to take stock of his resources. He must answer for himself questions like these:

Am I a salesman? If so, what can I sell best?
What capital or credit can I command?
What branch of the business do I know best?

These questions merely indicate the position in which a merchant finds himself. If his credit and capital combined are not equal to a big proposition, then he will have to start modestly and work up to the big proposition. Some of the best dealers of today are those who started in a one-man maintenance shop and have steadily worked upward by good business methods and a careful conservation of their resources. The natural step for the maintenance dealer is, first, the addition of an accessory stock, and second, the addition of a vehicle. Then he can gradually extend to a line of vehicles and will soon be a real dealer. Many of these men already

have been picked by factories to take over distributor establishments, because they have shown by their progress steady and approved business methods.

Some of the executives in the automotive dealer industry today are not salesmen, but more of them are the best salesmen connected with their establishments. Some of the larger dealers hire organizing executives to take charge of the establishment and carry out the ideas of the owner, while he devotes his attention to sales, chiefly to actual selling.

Selling is much more than the mere meeting of a prospect and getting him to sign on the dotted line. The entire promotion job, advertising, establishing good will and the attracting of the right kind of attention and the right kind of people is all salesmanship. Almost any intelligent man who thoroughly believes in a product can sell that product. Having the nerve to go about ringing doorbells and asking people to buy something is only one kind of salesmanship. A bigger kind is the placing of this product in the right attitude in the minds of the right people.

The answer to the question of "What shall I sell?" involves all of this and more. It involves a firm belief in the product. A Chicago dealer who sold two cars was not convinced one year that the car the factory was turning out was as good as it should be. He believed in the factory and in the eventual status of this product, but he thought that a mistake had been made in this particular model. He did not get much of a hearing or any results from protests to the factory, so, in order to protect his own position, he practically stopped his sales effort on that car that year. He could not put the proper belief behind the effort. A year later his belief in the company was justified and he renewed his efforts with a much improved car.

A man must first be sold on the merchandise that he plans to sell, if he will insure himself success.

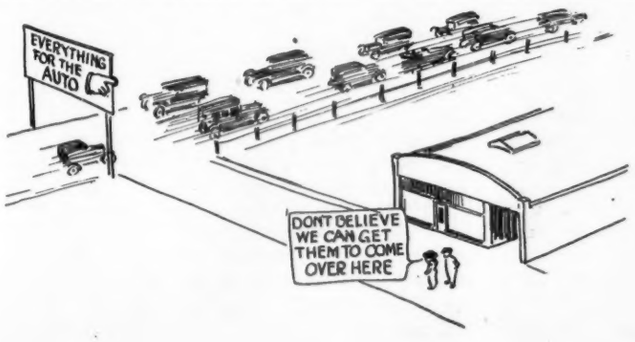
Where Shall I Sell It?

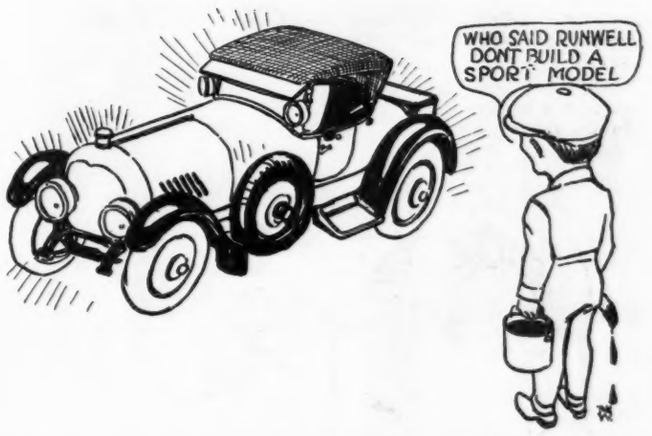
The natural place for a man to sell goods is in his own home town, where he can capitalize his knowledge of people and his past conduct. In some cases this home town location might be a handicap, but that is not the kind of man the automotive industry needs. The intimate knowledge of a community is an excellent thing for an automotive dealer; his knowledge of the conditions, of what the country lives on, what makes it prosperous and what brings stringencies, the tastes of the people, who has money, whose credit is good and all those things that it takes time to learn.

Some men know these things so well that they do not consider them an asset, and yet they are the most valuable asset to a man starting in business. It is like the Herbert Kauffman poem of the doleful Hindoo, who told the king that he "had nothing but trouble and poverty," but who a few moments later spurned the offer of the king of half that he possessed, gold and jewels, a harem and a prince's rank, because the king demanded in return a half of his children, one hand, one foot and one eye. This man suddenly learned that he was possessed of wealth beyond compare.

This is especially true of many automotive dealers. They have a knowledge of the people, the vehicles and conditions of their community that would mean increased sales and consequent wealth to many another man.

One evening a dealer sat in front of the hotel of his community and pointed out to a visitor a dozen persons passing who should be owners of the car he was selling—a rather high priced product. As the dealer and his visitor were parting, the dealer was asked if he had made sales advances to the persons he had pointed out. He had "never thought of that." This dealer the next year doubled his business and today he gives credit for the results to the advertising he did on a specially handpicked mailing list he compiled the next day. To most of this list he wrote personal letters, inclosing literature that referred to his car.





Many maintenance dealers today know intimately dozens of cars that need an overhaul, or they see cars pass their shops that need new brake lining, yet they do not capitalize this information as they should. Intimate knowledge is a great asset if it is used. The newcomer in your neighborhood would give much to have this information. The big maintenance dealer would pay well if the mechanic would tip him off to the things that he knows about cars.

To the man who already is in business there is still a question as to where he shall sell. The successful truck merchants learned long ago that the most profitable selling was based on an industry at a time. The same can easily be true of the passenger car. Try the country club list, advertise to it until your car becomes a matter of common talk in this club. Push this as long as there is profit in this particular line of attack, then try some lodge that has a clubhouse. Every town has a clubhouse that is popular with the young men of the community. Why not try the members out with a special line of literature for the sport model you sell? If you have not a sport model, why not make one with some paint and a few dressy accessories?

All of this comes in the "where." Perhaps you are not meeting with success in your community and you know why. Then the where comes under a slightly different listing. It might be cheaper to move than to turn the people of the community your way. Again, perhaps if you are out of line, it might be well to adjust yourself. There is a song that was popular some time ago, "They Were All Out of Step but Jim." We have all laughed over this mother's comment, but perhaps some of us are like Jim, and we had better get in step. It often is a question as to whether Mahomet will come to the mountain or the mountain to Mahomet. Usually the answer is the same.

Not long since, a young man wrote to MOTOR AGE to know what car he should specialize on in his maintenance establishment that he was opening. We asked him what car was the most popular in his community. He wrote back that he did not know. We referred him to the registration list and he found that all of his previous guesses had been wrong. Then he accepted our advice and decided to specialize in "orphan cars," and he is glad that he did. He found that a good many of the "orphan cars" of that neighborhood were not "orphans" in the general sense, but that they were cars that had been sold by dealers who had gone out of business, while the factories were still running. He has established some very good connections through his maintenance work on these cars and expects next year to become an actual vehicle dealer through one of these connections.

Another man wanted to know where he could set up in the maintenance business as a "Runwell" specialist. We sug-

gested to him that he canvass the towns in his section of the state and find where a "Runwell" dealer had quit business after selling a fair number of cars. He did that and found a community where he was needed and where the factory was glad to have him locate. He, too, expects soon to be able to finance a vehicle dealer venture.

These are just a few of the "where" suggestions. The question usually answers itself if you will put some common sense to work on the job of estimating the fundamentals of the community and the product and make an effort to adjust yourself to both. And remember, always, that the manufacturers you represent are a part of the fundamentals.

How Shall I Begin?

Money, credit, ambition and personal ability must be the factors in the equation that answers this question. There is not much that a man can get out of this life except a reasonable living and personal satisfaction. It is always to be hoped that his personal satisfaction will include doing some good for his fellow man.

No man can possibly get the satisfaction out of life who does not enjoy his work. Consequently, when he begins he should pick an occupation that will be a pleasure to him. His work must come under the head of personal satisfaction if it is to be a success. There is no wider range for this work than the automotive business. There is need of the man of the mechanical turn, the promoter, the salesman and the executive. Almost any man can find his delight in one of these and there need be no lost peace of mind as to whether the business is a worthy one. Selling transportation is one of the most substantial and beneficial employments that can be devised. No one will have, for a moment, any doubt as to the railroad business being worth while, and the automotive business is just as necessary with today's civilization.

"Where shall I begin?" is a question that many men in business today must answer, if they would continue and be prosperous. One very large motor car distributor was recently faced with this problem. He had neglected the maintenance end of his business and he knew it. He gave much serious study to how to begin in this end of the business. Also he realized that he has lost much business because he did not sell accessories. Finally he decided, he began, and already he has scored a success.

First, he built a building worthy of his business and the cars he had sold in his community. Second, he equipped this building to make it the best shop of the kind in the country. Third, he mapped out a plan of operation that took into consideration the welfare and comfort of the men he asked to work with him. Fourth, he organized a strictly modern selling of maintenance staff and established a flat rate system of charges. Fifth, he added an accessory department to this end of the business. Sixth, he hired a man, put him in a seven-year old car of the kind he distributed and sent him out to meet every car of the make and bring the owner to the new maintenance department.

This maintenance road salesman was a novelty, but he paid big returns. His old car appeared to be in perfect operating condition and was a testimonial in itself. Sometimes this man would sit for hours in his car, parked by a car that carried a license number that was not on the books at the maintenance department, and wait for an interview with the owner. This campaign more than trebled the number of maintenance customers on the books of this establishment. Then this man was loaned to some of that distributor's dealers and he continued his good work.

This case is mentioned specifically because it is the case where a man with a very heavy turnover, and with years of standing in a community, was confronted with the question of "How shall I begin?" and it tells the answer. Just common sense applied to the problem in hand.

If you are a maintenance man and you want to sell vehicles, look about you to see what vehicles are "orphaned" by desertion of the factory representative, the dealer. If it is a good car and it comes within the price class that you would like to sell, ask the factory about it. If you lack the money to start as a vehicle merchant right away, approach them with a view of becoming the official maintenance station in that section and perhaps you can promote yourself into a real dealership within a short time.

The vehicle dealer who has not yet begun to sell accessories, tires and similar equipment for the vehicles that he sells has not yet realized the full possibilities of his business and he should be asking himself about the beginning.

The maintenance dealer who is not planning a vehicle dealership for the future has not realized the possibilities and he, too, should be thinking about the beginning.

The accessory dealer can easily branch out both ways. This business is, of course, big enough for specialists, but even a specialist must look well into his immediate territory or he will become so much of a specialist that he is not keeping up with his specialty.

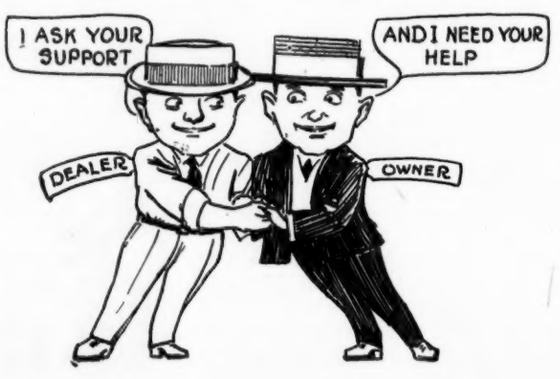
How Shall I Insure the Future?

Fundamentally there is only one way to insure the future, and that is to build a well-rounded business on the foundation of fairness to all concerned.

As this industry settles itself, there are going to be many changes in the contact with the owner of the car. More and more the owner is going to lean heavily on the dealer, and the wise dealer will lean heavily on the customer for his reputation in the community to which he looks for trade.

Some years ago in a midwestern city a car agency was suddenly pulled from a dealer and the writer went around to sympathize with the bereaved. Instead of finding him in deep mourning, the dealer was rather complacent. "They can takes the sales of their car away from me," he said, "but there are other cars of the same class, price and quality and I can get one of these to sell. But the factory sales manager did not know that he could not take the maintenance from me. Of the cars I have sold, all but half a dozen are coming into my shop for monthly inspections. My shop is on a profit basis and all of these customers believe in me and my shop. In this community my reputation is bigger than the car. In fact, the reputation of the car here is my reputation."

Events proved that this man was right. He put another and similar car into his salesroom and went on with his business. Later events proved that the factory had been dazzled by another man offering to take over their dealership and sell more than double the number of cars this man did, but he did not provide proper maintenance. He was a new car broker, and for two years he sold cars in greater numbers,



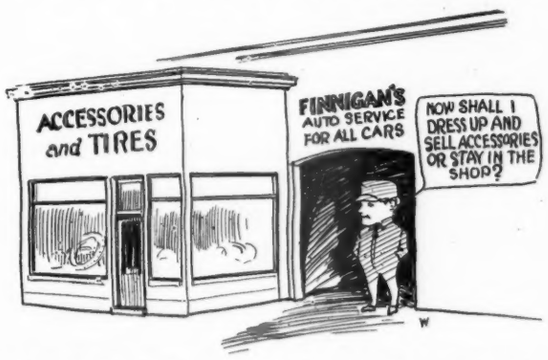
but the cars he sold drifted into the other man's maintenance shop and eventually were replaced by the car the former dealer sold.

Fortunately, instances where factory managers allow the sight of money to blind them to the qualities of a steady, seven days a week, year in and year out dealer are becoming rare. Factory managers are alive to the qualities of a good dealer and changes are being made only where there is a good reason for the change.

This change in the factory attitude is natural. The factory chiefs are making a study of merchandising and they have some very rational ideas as to what can be done in certain communities. They are less inclined to demand the unreasonable. Also they are willing to lend co-operation.

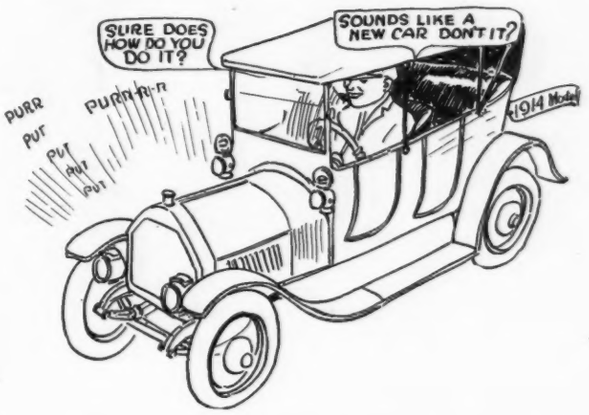
On this basis, the man who is willing to play fair with his customers, who will admit that the customer is boss and that maintenance is the best selling bet, has every opportunity to build a business that will grow with his community, and it will be a business that can be handed down to his sons and grandsons.

There are certain axioms that the man who builds for the future must remember. First of all, that he is selling transportation and not motor vehicles. The difference is that the customer has a right, when he purchases a vehicle, to expect transportation at a reasonable cost from that vehicle for a more or less definite period. He has a right to expect that the man who sold him that vehicle will remain interested in it until the reasonable period of activity is ended. If the man who sold the vehicle does not display this interest, he



has no right to expect this man to buy again. The seller who is not interested in the vehicles that he sells is not a dealer but a broker, and a broker does not build for the future but sells as a spot transaction.

If the vehicle is properly sold, the owner does not expect the dealer to maintain this unit of transportation during this period free of cost, but he expects to pay a fair price for the maintenance and that fair price should include a profit.



Today the motor vehicle manufacturers are working on a basis of prices that is closely adjusted to manufacturing costs. Production methods are constantly lowering this manufacturing cost, but the distribution cost is not keeping the production cost company. Now that manufacturing cost is well under control, it is only reasonable to expect that competition and a desire to sell as many motor vehicles as possible will bring the distribution cost under a closer inspection. When that is done, the dealers will be asked to share in the saving that must be made. This can be done only by better organization of distribution methods.

This will mean more efficient sales methods and a distribution of profit to other items than new car sales. Many elaborate dealer establishments today are supported entirely on the revenue from new car sales. The dealer is not even interested in making a profit in the maintenance department. He does not see the possibilities in selling accessories and he scorns such small articles of trade as tires, yet each car that he sells makes its owner a prospect for an annual purchase of, say, $75 worth of tires. Usually this prospective purchaser is allowed to walk out without an effort to anchor him to the dealer establishment. There is no other mercantile business that so calmly ignores its mercantile leads as the automotive vehicle dealer.

There are in Chicago several salesmen that average $150 of extra equipment with each car they sell. They laugh about how easily it is done. This $150 is merely added to the total bill, and while the purchaser is assuming monthly obligations, he does not shy at the extra amount. The buyer knows that if he does not buy then, he probably never will buy, and he knows that he wants the spare tire and the other trimmings.

It is these men, who are looking to the satisfaction of the customer and who look especially to making the first-time customer a long-time buyer, who are building for the future.

The Longest Way to Attain An End

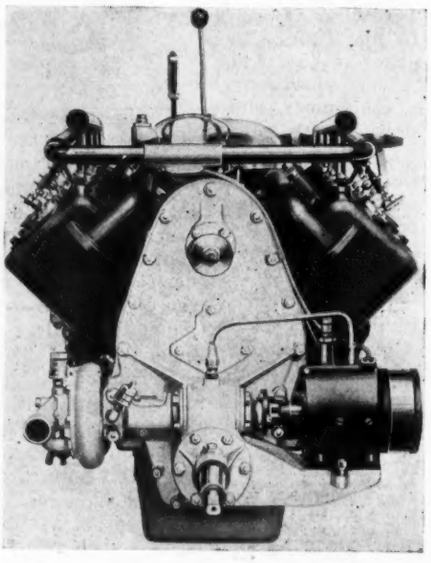
We do not know whose shop this is, but we are printing the picture because it shows how repair work should not be done. Note the position of the two men crouched around the cylinder block, supported on a wood box. No man can do good work unless the job is properly supported and at a convenient height. Also, we are wondering why a man has to lie on his back to work on an engine supported in a stand which apparently has a tilting feature to it. Maybe he is fastening the lower ends of the rods to the shaft, but even so, this could be done in a more comfortable position.

Peerless Has New Chassis and Nine Body Styles

Semi-Elliptic Springs New Used. Frame Lighter and Stiffer. Body Lines Entirely New

A NEW line of Peerless cars thoroughly refined mechanically and beautified from the standpoint of appearance has been put on the market for 1923. The car has an increase in wheelbase of 3 in. and is lower in appearance, due to the redesigned straight line type of body, underslung springs and smaller wheels. There are nine types of bodies now offered on the 128 in. wheelbase, standard chassis.

Probably the most striking change is the adoption of semi-elliptic springs, in place of the platform type of suspension. Practically every unit from one end of the chassis to the other has been altered in some detail to either increase its accessibility, to render it more sturdy in construction, or better in appearance.



Front end view of Peerless engine, showing the cross shaft driving arrangement of water pump and generator

While the engine has not been materially changed as far as the fundamental specifications are concerned, there are, nevertheless, a number of alterations of importance. By removing the tire pump from the front end of the engine, it has been possible to shorten the fan shaft, allowing the engine to be moved forward in the frame, thus giving a larger space in the front body compartment and greater accessibility to the steering gear and connections. A larger oil strainer screen has been installed as an independent unit in the lower half of the crankcase. This screen can be removed for the purpose of cleaning without taking down the under half of the crankcase. An old drain plug has been installed on the lower left side of the crankcase, this plug being removable for the purpose of draining oil with a special wrench, furnished with the tool kit, which obviates the necessity of getting under the car to drain the oil reservoir.

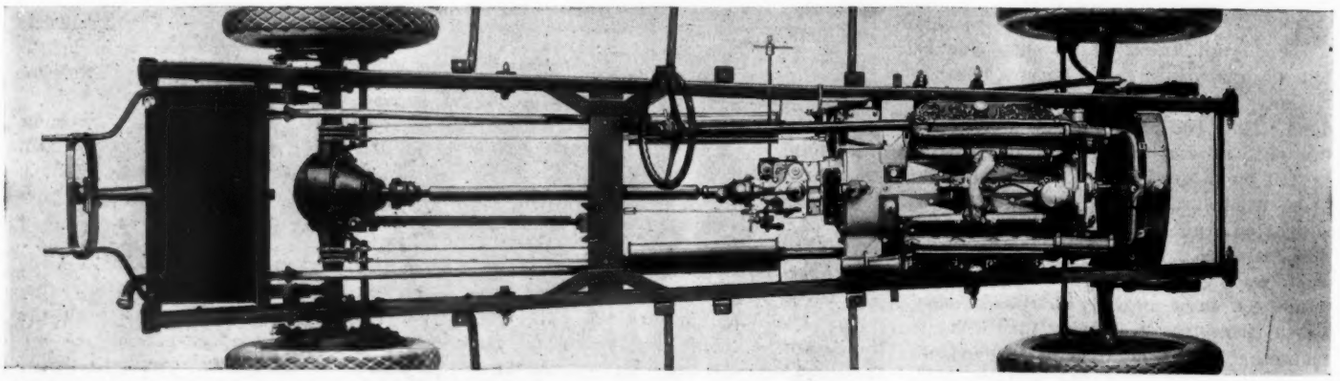
The front engine support has now been installed on the frame cross-member in a universal socket. Lubrication of this is obtained from an Alemite oiler. The water pump has been redesigned with larger capacity and double bearings, one on each side of the rotor. This, in connection with a larger packing nut, increases the life of the pump and makes it more accessible in taking up wear. The capacity of the new radiator is 7½ gal. The radiator shell is of brass with several coats of nickel plate.

Delco electric system is used. The distributor has been placed at the front end of the engine, now being bolted to the rear side of the timing gear housing and driven from the fan shaft gear. This location is more convenient when making adjustments. All wires have been placed in conduits. The distributor is an automatic type provided with a governor and equipped with double breaker contact points.

A somewhat lower compression rate on the clutch spring gives a softer pedal action. Oilless bushings have been installed for the clutch release parts. To take care of the installation of the tire pump, the transmission gearcase has been altered. A hose connection has been provided at the left dust shield to facilitate the operations of the pump which is now started by inserting a screw driver in the slotted head, that protrudes through the floorboard. A quarter-turn is sufficient to engage the pump gears. Another alteration in the gearset is due to the installation of a transmission lock.

Heavier construction is now used for the propeller shaft, this now embodying a tubular shaft equipped with Spicer universal joints protected by metal housings and lubricated by Alemite oiler. New type Timken axles both front and rear are employed.

The rear axle now incorporates the straddle mounted pinion shaft and has been provided with a pressed steel torque arm having a fabric connection at the front end instead of the usual spring type of connection, thus eliminating any necessity for adjustment or any possibility of rattle. The rear end is fastened to the rear axle housing by a pin encased in brass bushings, lubricated by the Alemite system. This same system is employed for lubrication of the axle shaft bearings and the spring shackles through tubes which are connected on each side



Airplane view of the new Peerless chassis. The tubular cross member and straight side rails are departures from previous practice

of the rear axle near the brake drum. The brakes are 15½ in. in diameter and 2½ in. wide. The internal brake is a new design, having no adjustments other than the brake rod, which takes up wear on the lining.

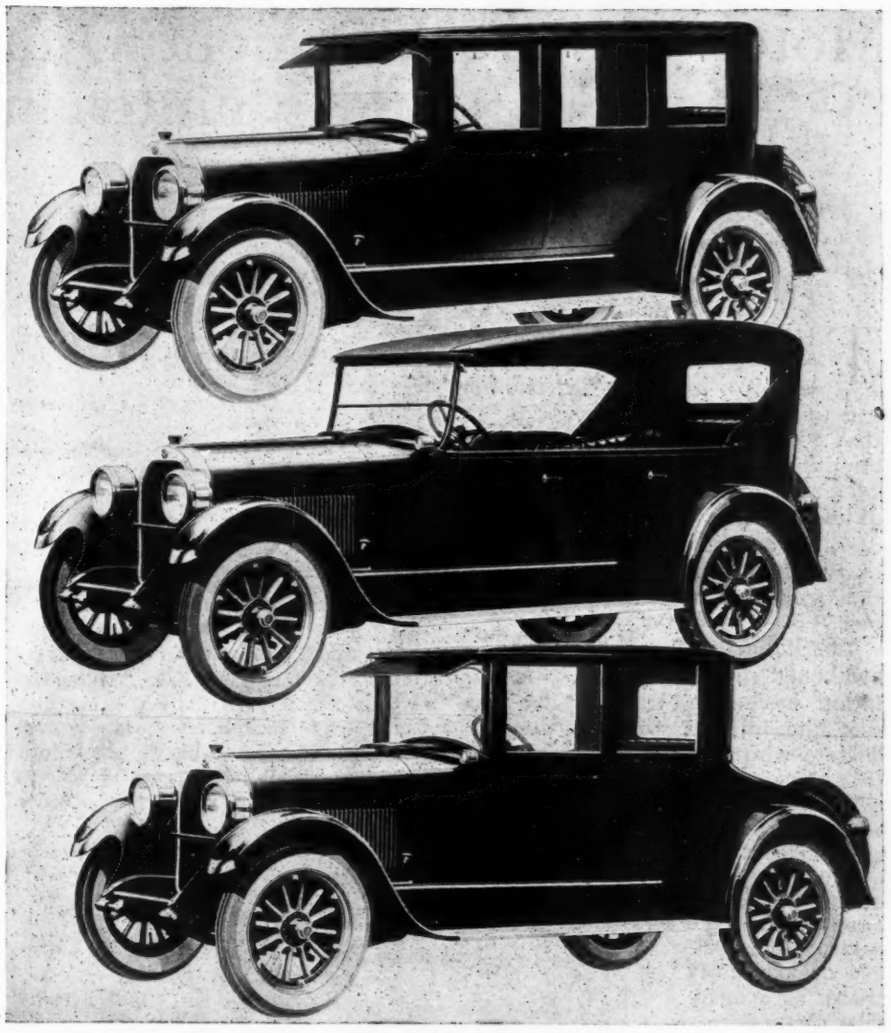
An entirely new design of frame is incorporated, this being more rigid and a better production job than the previous model. The side members are straight and have a maximum depth of 7½ in., thus eliminating truss rods to support the frame. Among the new features are tubular cross members, front and rear, pressed into the frame to take care of frame twist.

The wheels are of the Kelsey metal felloe type with tires 33 by 5 in. with twelve hickory spokes for both the front and rear wheels. The front springs are 41 in. long and 2¼ in. wide containing nine leaves for all body types. The rear springs are 60 in. long and 2¼ in. wide containing eight leaves for the lighter bodies and nine leaves for the heavier types. The spring shackles are heavy and adjustable to compensate for wear. The size of the spring bolts is ⅞ in. and are designed for adjustment without the use of spacers or cotter pins for locking them when making the adjustment. A Gemmer steering gear with 9½ to 1 ratio is used in these models.

The chassis equipment has been improved throughout. The battery is now an Exide, 6 volt, 120 amp. type carried in a compartment on the right side of the frame, access being had by removal of the cover which is set flush with the dust shield. This new location is quite accessible. The horn is a Kellogg. The rear lamp provides a combination tail light and stop signal. The stop signal switch is connected with the service brake pedal. The tail light also illuminates the dial on the gasoline tank and a trouble lamp of the reel type is mounted on the front face of the dash under the hood on the right hand side. The tire carrier is designed to carry two extra tires.

Nine types of body are mounted on the standard 128 in. wheelbase. These include a four-passenger touring phaeton, seven-passenger touring phaeton, two-passenger roadster coupe, four-passenger Victoria coupe, four-passenger suburban coupe, five-passenger town sedan, seven-passenger suburban sedan, five-passenger Berline limousine, four-passenger opera brougham. All of these bodies are new, not only in appearance, but in construction. The open cars have several unique points of construction which may be mentioned.

The four and seven-passenger phaeton are equipped with a permanent type of top constructed of steel tubing, with white ash strips, heavily padded and provided with the usual weatherproof top material. Although this is somewhat along the lines of the regular folding top, it presents an unbroken surface to the eye. At the rear, the top is fashioned in the shape of the gypsy quarter curtain and a bevel plate glass window is provided. The rather solid construction of the top permits of good fitting for the curtains. These open with the doors and give an enclosed body which is substantially weather-proof.



Three Peerless body styles, showing top to bottom, the five-passender touring sedan, seven-passenger touring phaeton and the four-passenger coupe. A trunk and visor are are included in the equipment of the sedan

The open bodies are equipped with a ventilator made integral with the top of the cowl and operated by a lever located just beneath the instrument board. The use of the ventilator makes possible a windshield of special design, the lower panel of which is unusually narrow in order that the intersection of the two glass panels will not come within the direct range of the driver's vision. The lower panel is removable and the upper panel is adjustable in or out. The mounting on the instrument board incorporates all of the units in three symmetrical ovals, two of glass and one of metal.

Additional equipment on these cars includes a rear vision mirror and a windshield wiper, hand operated. The four-passenger phaeton is equipped with a weather-proof trunk mounted on the rear. The open and closed cars have the following optional paint colors: maroon, suburban blue, dust-proof grey. The body, hood and wheels are in colors and suitably striped to accentuate the lines of the body. The running gear and fenders are black.

The closed cars are all of the soft top variety. Upholstery used in the five-passenger sedan is a mohair velour. The coupe, limousine and brougham are upholstered in cloth. The ceilings and walls above the belt line are covered with materials that harmonize in texture and color with the upholstery. The carpets used in the closed car interiors are of wool and match the upholstery. The driving compartment of the limousine and the brougham is finished in bright enamel leather with corrugated linoleum on the floor.

Dome lamps are standard equipment and the sedan, limousine and brougham carry corner lamps in addition. In place of the standard cowl lamp, the brougham is equipped with distinctive designed coach lamps on either side of the body just back of the driving compartment. The windshields differ from those furnished on the phaeton in that both the upper and lower glass panels are adjustable. A leather covered glass visor is fitted as standard equipment.

Motor Bus Development Offers Opportunity for Sales and Maintenance Profits

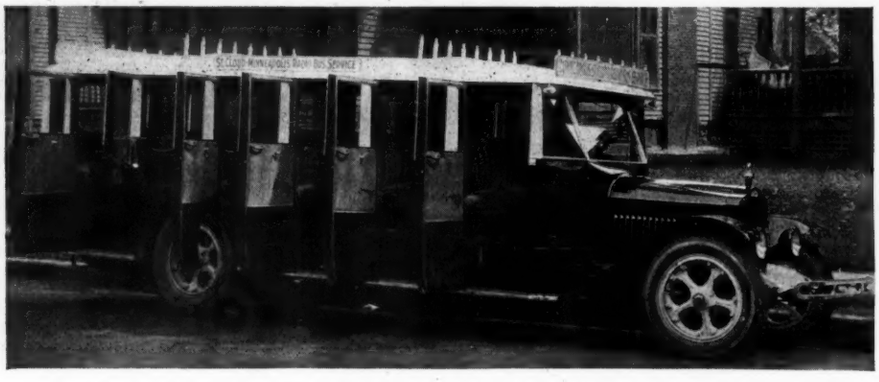
Facts the Dealer Should Know to Secure This Rapidly Growing Business, Which He Is Best Fitted to Handle

By B. M. IKERT

THE Chicago transportation strike and the political situation which led Mayor Thompson to suggest to the City Council that $3,000,000 worth of busses be bought to compete with surface cars, has awakened a sharp interest in bus transportation. The proposal of the Thompson administration is to run busses in competition with the street cars by charging a 5 cent fare.

The inquiries brought out by this awakened interest in bus transportation, have suggested that we present the following information for dealers who may wish to capitalize this wave of interest.

Those who have operated busses any length of time over various road conditions and city conditions are agreed that modified or unmodified trucks or automobiles are not capable of giving as uniformly good results as those of busses designed and built entirely for this class of work. Nor, has the present day motor bus attained a perfected state of design.



Bus used for interurban work between St. Cloud and Minneapolis, Minn. All seats, excepting the one over the rear axle face forward, and the side doors make for quick entrance and exit of passengers

Several large cities have experienced bus failures but analysis has shown that invariably the failure was due to a combination of several factors, chief among which were overloading, improperly built busses and general lack of experience in bus operation.

Opportunity for the Dealers

Motor busses today are being used to a great extent to supplement the electric railways, for carrying school children in the rural districts, and for transporting employes to and from factories in outlying districts. Thousands of busses are in operation over unimproved roads, in spite of the fact that many persons hold bus transportation can only flourish with the advent of hard roads.

Motor busses in general will in all probabilities be sold through regular distributors and dealers in much the same manner as the passenger car and truck are sold today. However, where railway companies buy a fleet of busses, they will be sold by direct factory representatives. Some bus makers have been educating their dealers to sell busses for consolidated schools, and they have done fairly well. The distributors in the larger cities get right on the job and with the help of the local dealer, put the proposition up to the school board.

The automotive dealer will always be in a position to represent the motor bus, except the large group of bus buyers, who will put in their own maintenance division along with the operating division. Even though these buyers will operate large fleets, they do not represent the big bulk of sales. Consequently there is no reason why the truck dealer cannot handle it as well as he can any other truck sale. The future extent of the bus business to be handled by the dealer will depend upon the amount of consolidation of small lines and the miniature of the dealer. Bus operation, in general, is getting into better hands and public utilities are coming into it with financially responsible people. In most cases these people are operating busses in connection with motor trucks for commercial use.

The motor bus will never wipe out the electric railways, no more than motor vehicles will supplant the overland steam trains. The bus will be useful in supplementing the work of the railways and steam roads as it is doing now. Aside from the apparent reasons which justify the existence of the motor bus, there are others. A bus is not limited by tracks. It is more flexible and can be rerouted to suit conditions when necessary. The failure of one bus does not tie up an entire line. These are but a few of the things in favor of bus transportation.

Vehicles Suitable for Busses

The automotive dealer should at this time turn his attention to busses, not only to sales but to maintenance. Some one has got to keep the busses in condition and who is there that is better equipped than the dealer to handle this end of the business? That the dealer might be better prepared to handle this work we present here some of the more important matters in bus design construction, operation and maintenance.

The type of vehicle used for bus transportation must necessarily be governed by local conditions. The bus to be used in New York or Chicago, and the one to be used for rural work differ very materially in design because the character of the service is vastly different. Thus, work, will differ for congested districts and where frequent starts and stops have to be made should be as low as possible. Light weight is another factor. In speaking of weight, we have in mind only those busses or chassis being built by truck makers for bus work. The busses operated by the Fifth Avenue Coach Co. in New York are a proposition unto themselves, inasmuch as the company designs, builds, operates and maintains its own equipment.

Many truck makers are offering special chassis for bus work, affording safety, speed, acceleration, ability to rapidly pick up and discharge passengers, comfort and capacity for an 18 ft. bus body. The opinion prevails among makers that a 3¾ ton chassis is the maximum for city work.

Busses for interurban service need not be built with the center of gravity as low as that in the city bus, because passengers do not have to be taken on or discharged as frequently. Nor will the bus with a low center of gravity and

consequent lower ground clearance work out as well in interurban work. A light bus will not, in general, stand up under severe road conditions and in view of this it has been found more feasible to retain the standard truck chassis for country busses. For general interurban bus work, the 1½ ton chassis has been found adequate.

From a business standpoint the safety and comfort of the passengers is one of the greatest items in the successful design and operation of a motor bus. Many special features have been taken into consideration in bus body design in this respect, among them the extension of the exhaust pipe to the rear of the vehicle, heating and ventilating, comfortable seating and long and resilient springs.

Effective Seat Arrangement

Regarding seating capacities, there seems to be three prevailing types; one carrying from 14 to 22 passengers; a medium type carrying 25 passengers on a single deck body mounted on a 2-ton chassis and a third type carrying 50 passengers on a double deck structure mounted on a 3½ ton chassis. For the smaller communities, the 21-passenger bus seems to meet with approval, while for rural districts a 1-passenger job, without provision for standing room, has been found satisfactory.

Coming to the arrangement of seats, it is the general opinion of those engaged in bus work that the cross seat is by far the best idea. For interurban work, it also is a good idea to have all or as many as possible, of the passengers face forward. Regarding entrances, the one-man front entrance type, with emergency safety exit in the rear, seems to meet the present demands of bus operation. For 50-passenger busses with double decks, the entrance and exit, obviously, would have to be from the rear.

A rather interesting seating arrangement and provision for entrance and exit of passengers has been worked out in the bus used by the Minneapolis—St. Cloud Radio Bus Service. The seats are placed crosswise the entire width of the bus and at each seat end is a door. Thus entrance and exit to any seat becomes a simple matter and the bus can be filled and unloaded in a very short time. A running board extends the full length of the bus. All the passengers face forward, excepting those in the seat just back of the rear axle which is placed back to back with the seat ahead of it. This arrangement allows sufficient clearance inside the bus for the rear axle housing.

Main Factors in Bus Design

Regarding tire equipment, it has been found that the city busses can be operated best and most economically on cushion tires. For longer runs in interurban work pneumatics are working out well.

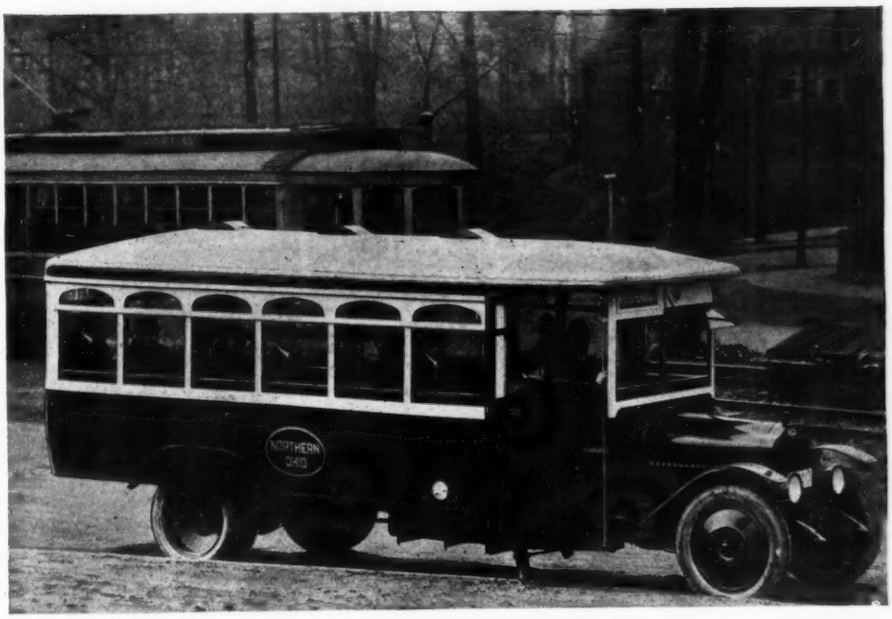
Many lessons in bus design, operation and maintenance have been learned by the Fifth Avenue Coach Co. and while these primarily deal with the operation of busses on the streets of New York, there is much that can be applied to the operation of a bus line regardless of its size, type of vehicles, or locality. The man who operates a single bus over a country highway or the dealer who expects to devote part of his maintenance station to the upkeep of rural motor busses can profit from the experiences of this company. Here is what the company has found out.

There are three main factors to be kept in mind in motor bus operation, 1. Comfort. 2. Easy operation. 3. Accessibility.

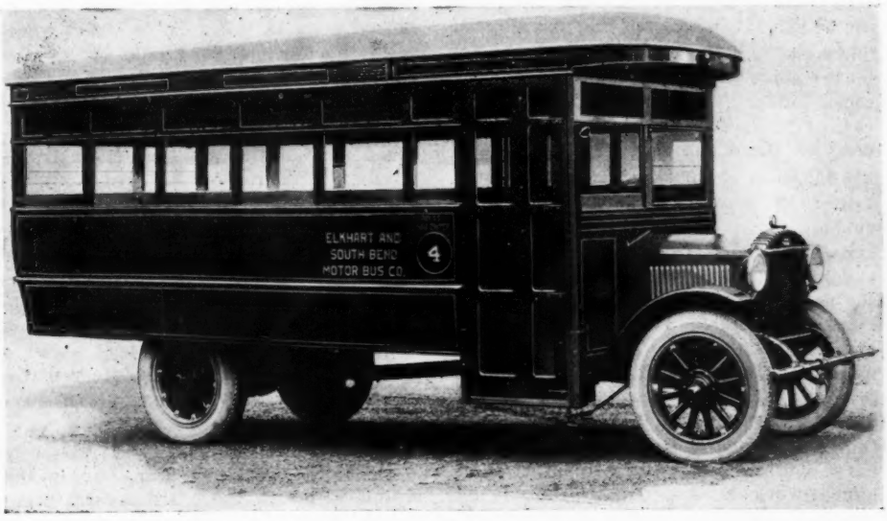
The last mentioned is of direct importance in the maintenance of a motor bus, for it must be remembered that the mileage on a bus will equal two or three times that of the ordinary motor truck and incidently the local dealer's maintenance station becomes an absolute necessity.

In the matter of comfort to passengers, trap doors in the floor should be avoided. In the past, these doors have been used by some in the hopes that they would afford ready means for getting at the chassis parts when repairs or adjustments were necessary. But trap doors are noisy; they are cold in winter; they cause exhaust gases to seep into the body and there is always the element of a careless mechanic getting oil or grease on the inside of the body when operating through these doors. They may cause accidents to passengers.

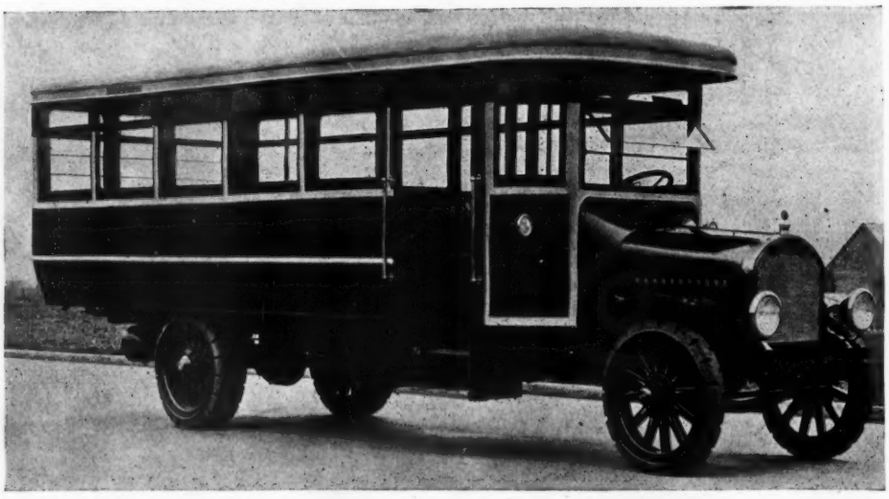
Springing of the bus, of course, is an item that calls for study. Busses carry varying loads and to secure maximum



A bus used to supplement street car service. The bus offers excellent cross-town transportation and is far less costly to operate



A type of bus used for interurban service between Elkhart and South Bend, Ind. This shows the one-door design which works out well on busses where stops and starts are not frequent



The Mack shock-insulated motor bus, an unusually roomy vehicle. An emergency door is placed at the rear

comfort with a varying load means something different from the orthodox spring must be used. The Fifth Avenue Bus Co. uses what is called a progressive spring. In this layout the upper leaves carry the weight of the bus and also an additional weight of the passengers. Then, as the load is increased shorter leaves come into action and support the upper ones. This is said to give very easy riding, even with the solid tires used on these busses.

Additional riding comfort has been obtained in these busses by the use of rubber shock insulators on the spring ends in place of the conventional shackles. This construction also avoids the necessity for lubrication and replacement of shackles, bolts, bushings, etc., and furthermore, no spring eyes are needed. The life of these rubber blocks is said to compare well with spring shackles. From the maintenance angle this is important because in the ordinary operation of trucks much maintenance work is directed to the spring shackles, which are subjected to considerable wear and often accelerated by failure to lubricate properly.

Essentials for Comfort

Comfortable riding of a motor bus means a wide frame, track and as great a width as possible between spring centers. The wheels should be as near the outer edge of the vehicle as possible because the movement to passengers will be less under these conditions when the bus passes over obstacles. Ruts and rough roads generally will be passed over more comfortably with a wide track. A strong frame, correct axle load distribution and the least amount of overhang at the rear are important factors that bear upon comfortable riding.

In order that passengers shall ride in comfort, a motor bus must operate as silently as possible. This is particularly true of the gearset noises arising at the time when the bus is started and the driver passes through the various speeds. Silent operation is necessary in crowded thoroughfares and is demanded by people in the residential sections. This means the motor truck designer must pay particular attention to securing freedom from engine vibrations, rear axle noises, body and chassis rattles, gearset noises, etc. In this respect steam would seem to offer many advantages for motor bus work.

The Fifth Avenue Bus Co. uses two types of gearsets in its busses, a four speed gear and three-speed chain transmission. Where grades are steep the four speed offers advantages. The silent chain driven transmission is useful for city work where frequent starts and stops have to be made. Observations seem to show that the chains are efficient and remain quiet the length of their life and one can expect about a year's service from them before replacement is necessary. Also chains are cheaper than gears.

Probably the greatest single factor in the smooth operation of a bus is the clutch, although there are several other things like the rear axle gear ratio, axle loads, engine operation and ability of driver that are important factors.

Probably much of the work in bus maintenance will be devoted to the proper operation of the clutch and the removal of the clutch body should be a simple matter, which is also true of the adjustment.

Safety of Operation

The matter of safety in a motor bus takes in a host of factors, such as the steering, conservation of driver's energy, floor constructions, placement of steps, clear vision of driver, and brakes.

In a public vehicle like a motor bus it is highly essential that the energy of the driver be conserved as much as possible and in this respect much attention must be paid to the steering of the vehicle, which should not be any more difficult for the driver than for a driver of a motor car. Proper attention to ratios of the hand and road wheels will solve this together with cutting down friction bearings. It is important too, that there be minimum wheel travel, so a driver need not shift his hands unnecessarily. Good steering facilities mean reducing accidents to a minimum and when we realize that the greatest work of a bus driver lies in the manipulation of the wheel, the necessity for easy operation becomes apparent.

In a motor bus clear vision for the driver is of utmost importance. He must be located as close to the left side as possible. The vehicle should have a continuous row of windows on both sides as well as the front and so far as possible there should be no posts or window frames directly in front of him to divert his attention from the road. The driver's comfort will take in such things as proper distances between foot pedals and seat, ability to reach the hand levers easily and also to stretch his limbs. A flat floor, in this respect, is considered by many to offer the best possibilities, rather than a sloping toe board.

Low Center of Gravity

The desirability of securing a low floor and one without obstructions of any kind is readily apparent. A low center of gravity is essential for safety in bus operation and other things being equal, a bus with a low center of gravity will have the floor at not too great a height from the road. And, usually the floor in such a case will be flat. Thus, the busses used by the Fifth Avenue Coach Co. have the center of gravity only 38 in. above the ground and the frame is but 25 in. above the ground. The floor is flat, which makes it stronger, safer and cheaper, in that it cuts down the likelihood of accidents to passengers.

In motor bus operation the application of the brakes is performed many more times than in the motor truck or passenger car. Therefore, the brakes must be very powerful and capable of locking the wheels at any time, but their operation should not mean any more effort on the part of the driver than with the motor car driver. Brakes must be free from rattles and the ordinary soft drum has been found practically useless. Heat treated steel forgings or steel castings have been found to give the best results. Outside brake adjustments are highly desirable and so far as possible no tools or special equipment should be necessary to make the adjustments. The brakes must not be set up too tightly, as the driver may rely on them too much and abuse them, much to the detriment of tires and the general mechanism of the bus, to say nothing of the discomfort to passengers.

Maintenance Problems

At first thought it may seem that the matter of accessibility in a motor bus is not so important an item as with the motor car or truck. But when it is realized that a bus, in order to be a paying proposition, must maintain its fixed schedules and, in short, be on the job all the time, the important matter of

having the various units accessible will soon manifest itself. It is human nature to criticize a public conveyance when it breaks down or is out of adjustment, whether it be a trolley car, steam train or motor bus. This is but one reason why it is important to have a bus in such shape that it will make its runs uninterrupted by breakdowns. When operating, a bus is a heavy consumer of both labor and material and to give some idea of this we show here the figures based on the average of all busses operated by the Fifth Avenue Coach Co. Owing to volume of passengers carried, local conditions, etc., these figures are much higher than would be the case of a bus operating in smaller communities or in rural districts. The cost per bus for 1921 was as follows:

Gasoline	$1,125.94
Lubrication	109.42
Tires	284.34
Repairs to chassis, labor	676.97
Repairs to chassis, parts	759.81
Repairs to bodies, labor	359.00
Repairs to bodies, parts	162.44
Drivers	3,071.71
Conductors	2,692.48
Total	$9,242.11

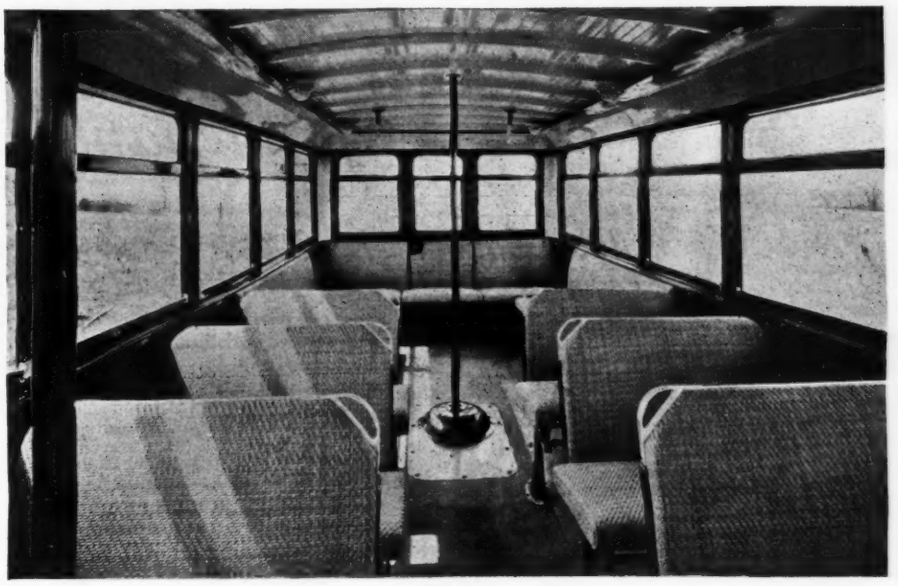
Probably in no other type of automotive vehicle is the separate unit idea in construction so desirable as in the case of the motor bus. The repair of any unit should not necessitate the removal of any other major unit. The engine, gearset, clutch, coupling, propeller shaft, axles, control levers, and similar parts should be units unto themselves.

Clutch Maintenance

All maintenance men know, for example, that in the orthodox unit type of power plant, the renewal of the clutch linings means the propeller shaft, gearset and control mechanism must first be taken down and it may even mean sliding the engine forward a trifle. Where the unit form of construction is used, only a few bolts need be removed, the housings removed and the clutch can then be removed as a unit. Linings can be replaced in 20 to 30 minutes on the busses of the Fifth Avenue Coach Co.

Here is what the Fifth Avenue Coach Co. has to say regarding accessibility of its busses:

The unitary system, if properly carried out, guarantees minimum loss of bus hours, minimum operating cost and minimum difficulties from the standpoint of training employees. Obviously less skill is required on the part of the mechanics where they are required to perform the same operation constantly. Here it is simply a question of specialization, but where the construction is such that multi-repair operations are required the situation is much more complicated. To be obliged to remove several units before a faulty unit can be inspected, repaired or replaced is a condition not to be considered for a moment. Such practice would be ruinous from a public utility standpoint.

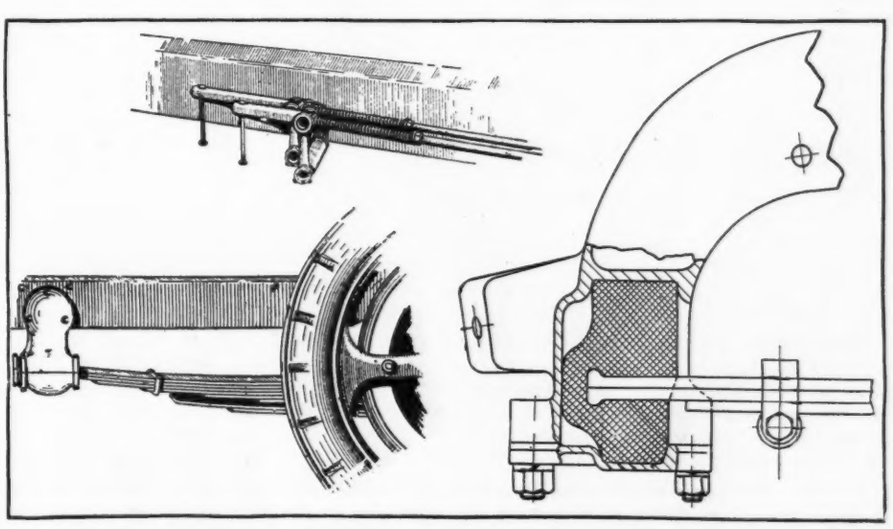


Interior of the Mack motor bus. Window and door frames are mahogany. The seats have spring backs and are upholstered in rattan. The floor is covered with cork linoleum, cemented in place

It must be remembered that the general conditions surrounding repair work are seldom ideal. There is the matter of wet floors, dirt surrounding the units and often lack of light. Garage forces must work Saturdays and Sundays, which is not particularly attractive. In actual practice, it is exceeding difficult to find men who are willing to work night. Taking it as a whole, the conditions surrounding the work of the repair man seldom bear favorable comparison with modern high class factory practice. Here again we wish to emphasize the desirability of unit construction for the theory is to remove the defective unit and take this to a central repair plant having all the advantages of a modern factory, so that the repairs can be properly executed by skilled men under the best possible surroundings.

Probably the greatest share of the maintenance work on busses will be done at night. It is highly desirable on those busses with a low floor level that adjustments and removal of units be carried out from underneath or from the sides. Obviously this means the use of pits in the dealer's maintenance station, or in the absence of pits, there must be available runways or racks similar to those used now for lubrication racks.

The experience of the larger bus companies shows that it is not satisfactory to carry out repair operations from the inside of the body, because claims from passengers as a result of getting grease or oil on their clothing are almost sure to be forthcoming.



Upper left, outside brake adjustment on the Fifth Avenue Coach Co. busses. Below, the progressive type spring arrangement. The upper leaves carry the weight of the bus and a little of the additional load of the passengers. When the load is increased the lower leaves come into action. Right, rubber shackles of the Fifth Avenue busses, said to make the vehicles ride very easily

Unit Replacement System Aid in Truck Maintenance

Autocar Co. of St. Louis Has System Whereby Truck Can Be Put Into Operating Condition In Short Time—Replacement Parts Cut Down Need for Special Machinery in Shop

By B. M. IKERT

THE unit replacement system of truck maintenance is rapidly gaining popularity. This system in no way interferes with the installation of a flat rate, but rather adds to the flat rate opportunity as the heavier work can be done in a regular way, instead of creating disorder in the shop practice by rushing an engine or axle job through the shop because the particular truck on which repairs are required is of especial value at that time to the owner.

The unit replacement system merely calls for the installation of another engine for the one that is to be overhauled. The truck owner is not, usually, greatly attached to a particular engine but he wants transportation without interruption. With a sufficient stock of parts for replacement, the maintenance shop can be conducted in an orderly fashion with work scheduled several days ahead.

One maintenance station that is operated on this system and finds it satisfactory, is the Autocar branch in St. Louis. Some observations in this shop during a recent visit are recorded on this page:

1—The unit design of the truck facilitates replacements.

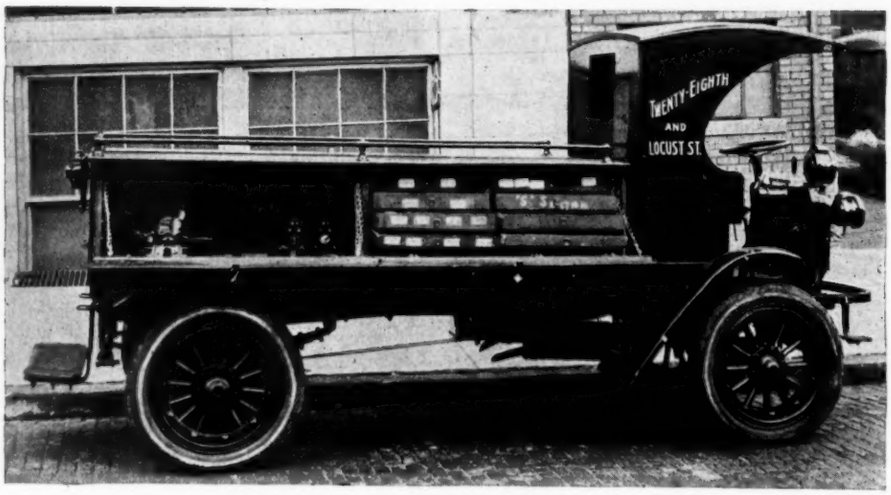
2—Bushing of all wearing surfaces makes it easy to replace worn parts.

3—Men are kept busy in shops working on replacement units.

4—Any job can be quickly handled by concentrating several men on it.

5—The company operates a service truck, completely equipped.

The fact that this St. Louis company is able to render its service efficiently and profitably is due largely to the unit design and construction of the Autocar truck. Maintenance work on this truck is always spoken of as a unit proposition, and as such has had a direct influence on the handling of the work in the shop. This probably is more easily applied to a truck than to a passenger car. Usually a truck operator does not care so much whether he gets his own engine back in the truck on the unit replacement plan. All he wants is an engine which performs well. With a passenger car owner it is different. Such an owner, while he wants an engine which performs well, in addition wants his own engine, because he has learned to believe it possesses certain qualities which he might not find in another engine of even the same make or model. Or, maybe, he has been very careful of his engine and is afraid if he gets some other engine it may have been abused at some time, even though it has gone through the dealer's shop and has been reconditioned.



The service car used by the company. It carries a complete assortment of replacement parts and is also used for towing in disabled trucks which cannot be repaired on the road

Influence on Parts Situation

In the St. Louis branch of the Autocar you will find the shelves and bins completely stocked. This is true of even such parts as may be readily obtained in a city like St. Louis by the local representative of such parts. Thus it is possible to get parts for the magneto and carbureter used on the truck, even though both of these units are handled by separate organizations in the city. In fact, at one time the Autocar company was called upon for a certain magneto part because the part was not obtainable at the time at the local branch.

The unit design of the truck has made it possible for the company to have on hand at all times eight complete engines, six axles, transmissions, steering gears, etc. Thus, when a truck comes in with a disabled transmission, for instance, the latter is removed and a replacement transmission installed. This gets the truck into service again in the shortest possible time. The transmission which was taken out of the truck is then sent to the shop and the necessary repairs made, after which it is in shape to be installed in the next truck coming in with trouble which might require the installation of a new transmission.

Accessibility a Feature

The replacing of these units is greatly facilitated by the general design of the truck, and naturally the changes can be made quickly. Accessibility has always been a feature in the construction of these trucks, which, with the unit construction, is readily appreciated by those who are called upon to get a truck in service again as quickly as possible. For example, the speed change and brake control lever set is a unit placed at the forward end of the truck and does not interfere with the removal or installation of the transmission, which is located amidships.

On one type of rear axle built by the Autocar company the jackshaft and differential are carried on the front cover plate, which, after disconnecting the

drive or propeller shaft and disengaging the drive axles from the differential, may be removed as a unit, without jacking up the car.

In the shops of the Autocar Co. of St. Louis there is no great need for special tools and machinery, due, in the main, to the construction of the truck and the unit replacement idea. The fact that bushings are used wherever possible in the truck is largely responsible for doing away with the necessity of installing elaborate shop machinery. One or two arbor presses will do the work. On certain parts of the brake mechanism, also, the company has fitted wearing strips which can easily be replaced, thus saving the truck owner the cost of a set of new brake shoes, and incidently making the job of renewing these parts comparatively simple. The complete stock of parts carried also makes it unnecessary for the company to have to resort to making parts or doing any special machine work which might require the services of a lathe, shaper, etc.

Men Kept Busy

One of the advantages gained from the unit replacement system is that the men in the shop can be kept busy practically all of the time on repairing the units. There is no such thing as time lost between jobs. As soon as the mechanics have gotten a truck out of the shop they go to work on the units. The men are not rushed in their work on overhauling the damaged or worn units and consequently better work is possible. The shop is departmentized to the extent that certain men do engine work, others axle work, etc.

When a truck comes in and it is necessary to get it out very quickly, several men are taken from the shop and put on the truck. Thus, if a truck comes in for a job of relining the brakes two or three men get going on it and remove the brake bands. The old bands are laid aside and a set of replacement bands, which previously have been lined in the shop, are installed. This means that the driver of the truck does not have to leave the vehicle for a long period while the old bands are relined. The old bands are relined later on in the regular work of the shop and then are installed in the next truck which might require new bands.

A well equipped service car is a necessity in truck maintenance and one of the most completely equipped cars of this kind is the one operated by this St. Louis concern. The truck is built with compartments on each side containing an assortment of units and parts which are likely to be needed in service. One section contains a nest of drawers in which are contained the smaller parts, including those known as the "S" section. This section contains cotter pins, nuts, bolts, etc., for which no charge is made to the customer. It is felt that it is cheaper to give these to the customer than to make out sales slips, etc. Of course, this holds true only where a few of these smaller parts are needed. There is a similar section in the stock room of the establishment, also designed as the "S" section. One man on the service car can take care of any operations on the road, whether the job be that of installing a new magneto breaker or getting a truck out of the ditch.

COATS STEAMER PROGRESS

COLUMBUS, Aug. 21—The Y. F. Stewart Motor Car Manufacturing Co., will soon have a number of cars to be known as the Coats Steamer coming through the factory. One demonstrating car has been completed. Agents are being signed up in various sections and the announcment is that cars will be coming through in about three months and possibly earlier. The phaeton will sell at $1,085 and the sedan at $1,495.

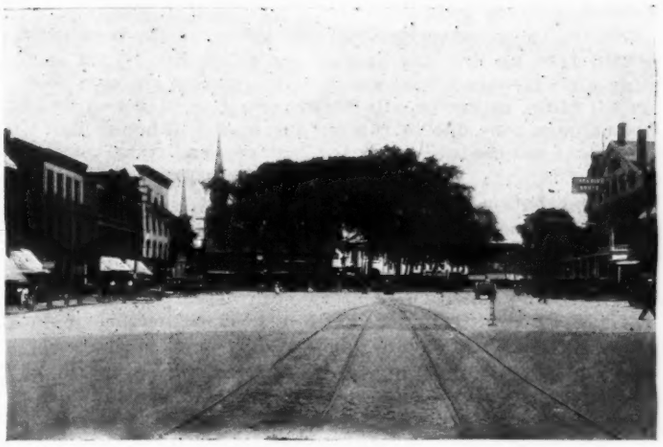
CHANGE IN LINCOLN PRICES

DETROIT, Aug. 19—The Ford Motor Co. has reverted to a 136 in. wheelbase for all models of the Lincoln car. The coupe was the only model having a 130 in. wheelbase. Prices have been decreased $200 on the sedan and increased $500 on the coupe. The new list is as follows:

	Old Price	New Price
Sedan	$4900	$4700
Coupe	3900	4400

What Has Your Town Done to Attract Motorists?

There Is a Suggestion Here for You



These are pictures of what is said to be the widest cement paved street in the country. It measures 140 ft. from curb to curb. It is made of 7 in. reinforced concrete and the slabs are laid directly on the soil. This street is not in one of the large centers of population, but is in Keene, N. H., which is the geographic center of New England and a center of tourist activities. The city considers this street an excellent investment. Keene has a population of 11,500 persons and 5,000 elm trees

Many things can be done to attract that big item of business—the tourist trade—to your town.

Isn't there some spot somewhere in your community that people would like to see if they knew it was there? Aren't the hotel-keeper, the stores and the town officials interested in "putting the place on the map"? It means money for everybody, including you—the tourist trade is something worth going after and going after big.

Some Trouble Shooting Pointers on Starting Motors and Generators

Testing Kinks for Any Job That Can be Gleaned From Careful Study of Specific Electrical Systems

By A. H. PACKER

IN the electrical articles which have appeared from time to time, it has been the desire of MOTOR AGE to do two things. First, to clearly present the details of the particular electrical system under discussion. Second, to bring out fundamental methods of testing and analyzing circuits so that on other cars the same methods could be employed, even if a specific explanation should not be available. In this article it is our intention to point out general tests for locating starter and generator troubles, showing how they have been used in the detail discussions of previous issues and how they may be applied to any electrical system.

We will begin by taking up methods of testing the starter circuits. In Fig. 1 we have a starter circuit, with voltmeter connections shown where various test readings are to be taken. The use of the voltmeter is usually made only after a preliminary test has been made by turning on the headlights and observing their action as the starter button is pressed.

The action of the lights can be classified as follows,

LIGHTS GO OUT, SHOWS POOR CONNECTION.

LIGHTS STAY BRIGHT, SHOWS OPEN CIRCUIT.

LIGHTS GET VERY DIM, BATTERY LOW OR SHORT IN MOTOR.

Using the Voltmeter

A voltmeter is nearly always employed without disconnecting the circuits being used, and in Fig. 1 it will be seen that the voltmeter positions are such that their connection does not interfere with the regular connections of the circuit. The fact that seven voltmeters are shown does not mean that one will not do the work, and we may therefore consider these to be seven different connections for the same test meter.

Referring now to the indications obtained on the headlights, we will take up first the case where the lights go out indicating a poor contact somewhere in the starter circuit. Position V-1 of the voltmeter will test the ground connection which is sometimes poor due to rust on the frame, although it may be so tight mechanically that the bolt can hardly be removed to get the terminal loose. With the meter in position V-1 and the starter button depressed, starter current should flow and if the connection being tested is good there will be no reading or a barely perceptible movement of the needle.

This test applies to ANY CAR, ANY SYSTEM, and ANY VOLTAGE, and can be used at any connection WHILE CURRENT IS FLOWING, to see if it is a good connection or not. POOR CONNECTIONS show high readings and good connections show low readings or no readings at all, depending on the amount of current and the nature of the resistance and the sensitivity of the voltmeter.

Corroded Battery Terminals

The ground connection is not the only place that may keep the starter from working due to a poor contact, the battery terminals also being frequent offenders. In this case the voltmeter should be connected from the battery post to the cable terminal attached to that post as shown at V-2, an appreciable reading with the current flowing showing trouble here. The same test can be made on the other post also. Another possibility is in a terminal poorly soldered to the cable, where the connection is good enough however, so that casual inspection does not reveal the true condition. To test this condition it is well to drive a small nail right through the starter cable so as to make a good contact with the wire itself, and then test from the nail to the terminal at each end of the cable.

As shown in Fig. 1, voltmeter No. V-6 is also connected so as to show up a poor connection, for if the starter switch contacts are burnt or dirty, there will be a loss of voltage there which will show up on the meter.

The voltmeter test for poor connections in the starter circuit was described in previous issues of MOTOR AGE, as follows:

Dodge	Page 22	Dec. 1, 1921
Buick	Page 19	Dec. 15, 1921
Overland	Page 20	Dec. 29, 1921
Studebaker	Page 21	Feb. 16, 1922
Chevrolet	Page 20	Mar. 9, 1922
Maxwell	Page 22	Mar. 23, 1922
Oakland	Page 24	Apr. 13, 1922
Oldsmobile	Page 22	Apr. 27, 1922
Hudson	Page 23	May 18, 1922
Reo	Page 20	June 8, 1922
Chalmers	Page 19	June 29, 1922
Chandler	Page 18	July 13, 1922
Nash	Page 22	July 27, 1922
Paige	Page 21	Aug. 17, 1922

In the case mentioned where the lights stay the same brightness when the starter button is pressed, meter V-7 will help to check the cause of the condition. If it shows the same voltage that is obtained at the battery it indicates that there is an open circuit in the motor, the most common cause being worn brushes and burnt commutator which usually requires turning down the commutator and installing a new set of brushes.

Should there be no voltage reading at the motor however, it indicates an opening somewhere else in the circuit, and other readings should be taken from the frame of the car to various parts of the starter circuit.

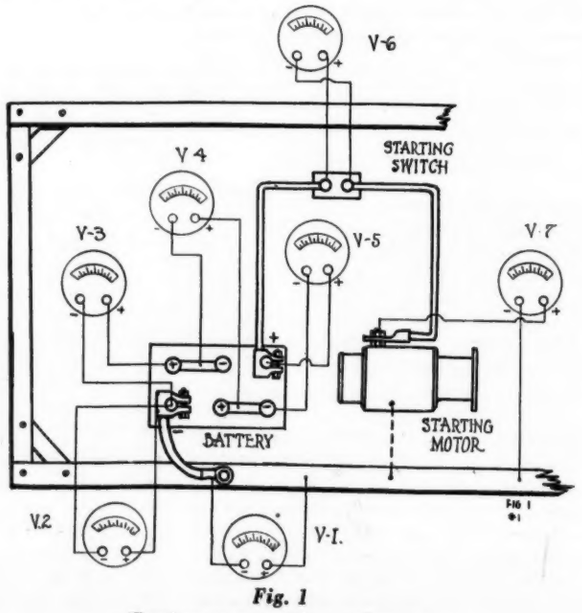


Fig. 1

Testing starter with a voltmeter

In the case where the lights get very dim when the starter button is held down, it is possible that the battery is discharged or that there is a short or mechanical trouble in the motor which makes it draw a heavy current. The battery can be checked with a hydrometer and also with a voltmeter, and referring again to Fig. 1 positions V-3, V-4 and V-5 we see the meter connections that will check up each individual cell of the battery. These cell readings if lower than 1.6 or 1.7 show the cell to be discharged while if the reading is mucn lower, or there is no reading it shows the cell to be shorted. A shorted cell will also give a reverse reading, making the needle of the meter kick back against the pin, when properly connected as shown in Fig. 1.

If there is a mechanical bind in the motor such as might be due to a badly worn bearing or if there is a short or ground which would pull a heavy current from the battery, the readings of 1.7 volts per cell may be obtained even if the battery is practically charged. For this reason the test shown in Fig. 2 should also be made, the high reading ammeter being connected in the circuit. NOTE that when the voltmeters were connected it was NOT necessary to disturb the regular circuits, but when the ammeter is used it IS necessary to disconnect the circuit to get the ammeter properly connected. In this illustration we have shown a high reading ammeter which requires an extra shunt used with it, as it will burn out if the shunt is not used. The shunt carries most of the starter current, while only a small portion actually goes through the instrument. Some meters have the shunt built in them, so

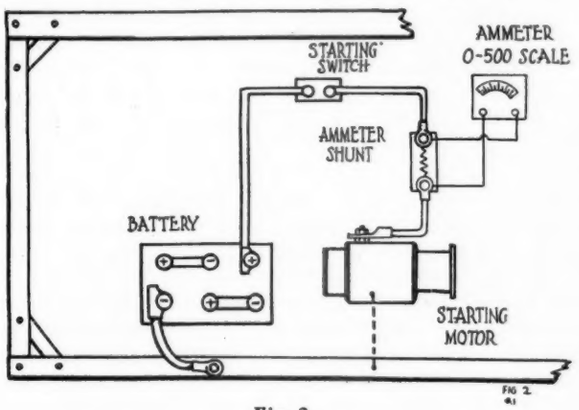


Fig. 2
Testing starter circuits with an ammeter

that instead of connecting the two heavy cables to the shunt terminals they are connected to heavy terminals on the meter. It is still necessary however, to open the starter circuit to get the ammeter connected in properly.

Most engines, unless recently overhauled, require a current of from 125 to 150 amperes to crank them, so that if the reading on the ammeter should be in excess of 200 amperes it would be a nearly certain indication of something wrong in the motor.

When it becomes necessary to take the starter apart, it will usually be found that the trouble will be located by inspection. In the case of suspected grounds, however, it is best to test with a 110 volt lamp line as shown in Fig. 3. Before making this test however, it will be necessary to disconnect any internal ground connections that are normally used. In the illustration shown this will mean disconnecting the two ground brushes from their connection to the frame of the starter.

Generators

When we come to consider the generators that are used on the 15 cars whose electrical systems have been described we find that there is a great deal of similarity, all of them having third brush regulation. Some difference is noted in the Dodge, Buick and Hudson, having motor generators while separate machines are more commonly used. The generators are usually made with two or four magnetic field poles and as the automotive electricians are sometimes called upon to work on an unknown generator, it is well to consider some of the simple features which are incorporated in all of these generators.

In Fig. 4 there are shown four sketches, the upper two representing possible connections which can be made with generators which rotate in a clockwise direction as seen from the

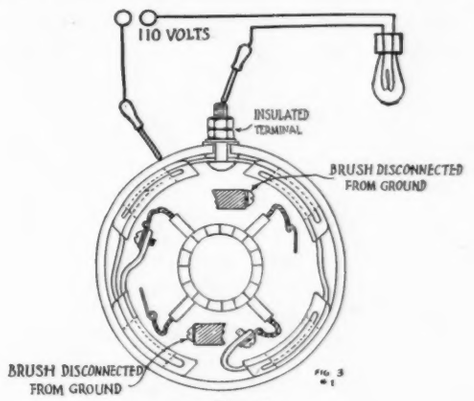


Fig. 3
Testing starting motor for grounds

commutator end while the two at the lower part of the sketch show generators with the fields connected for counter clockwise rotation. There is a general rule which is applicable to both two and four pole generators to the effect that the fields must always be connected from a main brush to the following third brush tracing in the direction of rotation.

In the upper two sketches it will be seen that in the one at the left we trace from the insulated main brush through the fields to the third brush which is very nearly located in the same place as the grounded brush. In the sketch at the right the fields connect from the grounded brush around to the third brush which in this case is very near to the insulated brush. There is absolutely no choice in regard to these methods of connection from an electrical standpoint, although the one at the right might be preferred as it would be possible to ground the field any place or connect it through a fuse to ground and it would not be necessary to actually bring the wire back to the grounded brush holder.

If a machine of this type were connected as shown and when operated as a motor was found to run in the reverse direction from what it was supposed to run it would then be necessary to just reverse the two field connections connecting to the third brush the wire which formerly went to the main brush and connecting to the main brush the wire which formerly went to the third brush.

The importance of this rule, in spite of the fact that it is very simple, is illustrated by a case where an electrical shop worked two or three days on a generator which they were unable to make regulate although it generated fine, in fact too fine, the charging current going up to 35 amperes whereas it

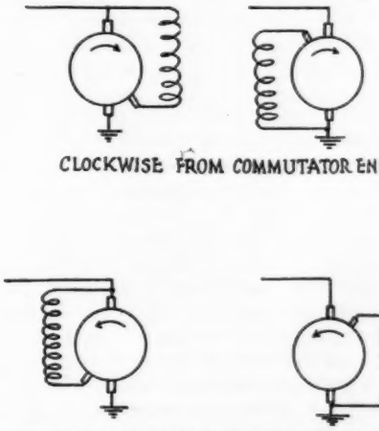


Fig. 4
Third brush two pole generator field connections

should have stayed down to 15. A man familiar with this simple law happened to loiter into their shop and noted that the connections were as shown in one of the bottom sketches while they were trying to make it rotate as shown in the upper sketch and, in fact, the machine would rotate in that direction.

The trouble was due to the fact that with the wrong connection, the magnetic effect which is supposed to give regulation and cut down the current has just the opposite effect and increases the output of the machine.

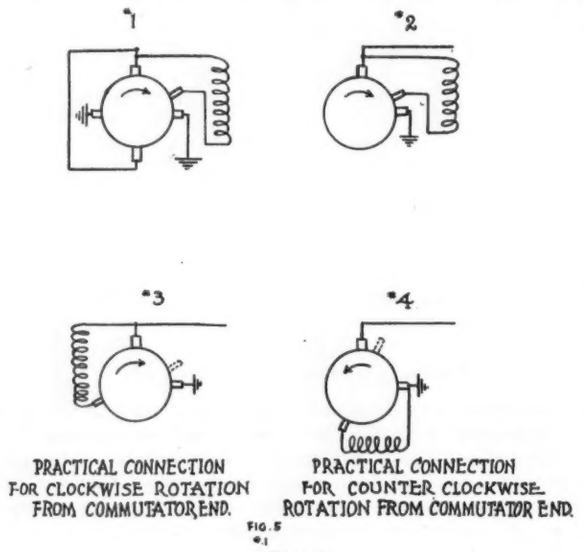


Fig. 5

Third brush four pole generator field connections

In Fig. 5 there are shown four sketches of connections for four pole generators having third brush regulation. In number 1 is shown a possible diagram but one which is practically never used. With a four pole machine we have a north, south, north and south pole tracing around the field frame; in other words, the opposite poles are the same polarity. For this reason opposite sides of the armature will be the same polarity and we will say that the upper and lower brushes are both positive, while the two brushes at the right and left side will both be negative. It is for this reason the machines can be made with two brushes instead of four, assuming that these brushes are big enough to carry the current so that the diagram in Fig. 1 can be simplified as shown in Sketch No. 2.

Here we are following the general rule and have the field connected from the main brush to the following third brush which is located before we get to the next main brush. It will be noted, however, that from a mechanical standpoint we have a rather crowded condition, as we have three brushes in ¼ of a circle, while ¾ of the circle is not used. In No. 3 we have a variation from No. 2 in as much as the third brush has been put on the opposite side of the commutator. As previously mentioned opposite points on the commutator are of the same polarity so that it gives electrically exactly the same result as would be obtained in No. 2 and the mechanical construction is much better as the three brushes are located in three different parts of the end bracket and there is plenty of room for the brush holders, springs, etc. Looking at No. 3 it would appear as if the field were connected from a main brush to the preceding third brush. This is not true electrically for it is really connected from the top or insulated main brush to the dotted brush shown on the right. In similar manner No. 4 as shown in Fig. 5 shows connections which would be best for the reversed rotation.

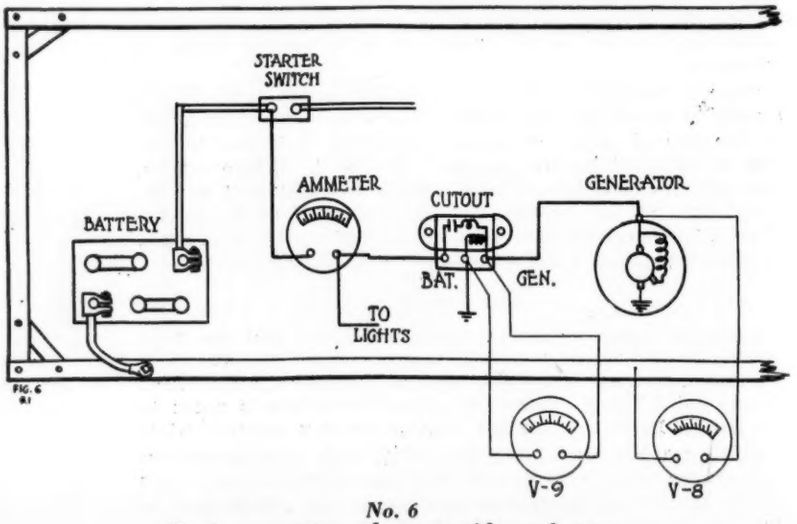
In practically all of the specific electrical articles which have appeared in previous issues of Motor Age methods were given for testing out the generator on the car so as to be sure of the exact nature of the trouble. This is especially desirable where ignition is mounted in the generator and it is necessary to retime the engine when the generator is replaced. In Fig. 6 is shown the frame of the car with the starting circuits indicated and the generator circuits shown in detail. These circuits are representative of the various popular cars and from them it is very easy to determine the nature of trouble which prevents the generator charging the battery.

Use of Wiring Diagrams

Trouble shooting is nothing more or less than knowing what the circuits should be and testing them to see if they really are correct and in this sense it is somewhat similar to the job that a bank teller has in detecting counterfeit money. To efficiently detect spurious currency, the bank teller should be perfectly familiar with the details of the genuine money. In a similar manner the electrician who is most capable of locating trouble is the one who is most familiar with the nature of the circuits when there is no trouble present. While the diagram in Fig. 6 shows the general nature of the circuits on cars today, it is also true that there are so many variations and slight modifications that it is certainly necessary to have a diagram of the car on which you are working, in order to do the job quickly and accurately.

Referring now to Fig. 6 which we will assume is a sample wiring diagram taken from a wiring manual and exactly suited for the car on which we are working, we will note that we have a generator which will be connected through the ammeter to the battery whenever the cutout points close. For this reason it is easy to use battery current to check the generator circuits and if we should remove the cover from the cutout and close the contacts, the current from the battery would flow to the starter switch and from there to the ammeter and through the ammeter to the battery terminal of the cutout and then across the contacts to the heavy winding to the generator terminal on the cutout and then to the generator terminal. Through the generator to ground there are two circuits, one directly through the armature and one through the field winding to the third brush and through part of the armature to ground.

You will note how simple it is to trace these circuits and get an understanding of what is happening on the car when the diagram is available, and since there are two circuits through the generator we should check both of them. To do this it is well, if possible, to lift the upper main brush which will kill the armature circuit and still allow current to go through the field and the third brush and the grounded main brush. Now if the closing of the cutout points shows one or two amperes we know that we have a field connection, and then if the main brush is replaced and the current shown on the ammeter



No. 6

Testing generator and cutout with a voltmeter

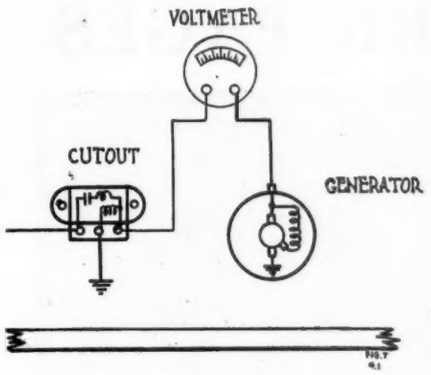


Fig. 7
Checking shunt winding of cutout with a voltmeter

is increased we know that we have both field and armature circuits.

In generators which have the field fuse it is possible to merely hold the cutout points closed and snap the fuse in and out to see if there is some sparking at the fuse clip and a slight change in current reading on the ammeter which would show that both the armature and field circuits were O. K. After this test has been made it is usually well to hold the points on the cutout still closed and start the engine and see if the generator shows charge. If the discharge current which was obtained when the points were closed comes up to zero and stays there is quite likely that the armature is shorted while if it goes over to 10 or 12 amperes the generator is apparently O. K.

It sometimes happens, as has been mentioned in the various articles, that the generator will charge O. K. when the contacts points in the cutout are closed but will not charge and build up by itself. Under these circumstances a voltmeter should be used as shown at V-8 connected right across the generator. Then when the engine runs it is possible to see whether the generator is doing its part. If the generator shows a reading of about ½ volt the fault is in the generator while if it generates 8 volts or more the generator is O. K. Under these circumstances the reading should be taken as shown at V-9 so as to check up the voltage at the cutout and if there is no voltage here the fault is either in the wire from the generator to the cutout or in the ground connection on the cutout. If the voltage here is O. K. a meter should be connected as shown in Fig. 7. Note that this connects the voltmeter in series with the generator and the cutout which is wrong for operating. It is good however, to check and see whether there is an open in the shunt or fine winding of the cutout. If this voltmeter shows practically the same reading that was obtained at V-8 in Fig. 6 it shows the fine winding is O. K. but if there is no reading with the engine and generator running then the fine winding is broken and a new cutout should be used.

If with the cutout points closed you are unable to get any current through the ammeter and cutout to the generator, it is possible that there is a break in the circuit between the starting motor and the ammeter or in the ammeter or between the ammeter and the cutout. This can be checked either with a voltmeter connected from the frame of the car to various points in the circuit or can be checked with a 6 volt test lamp. The 6 volt test lamp is safe to use on circuits connecting back to the battery but is not safe to use when running the engine and checking circuits from the cutout forward towards the generator as the voltage may be much more than 6 and may burn out the lights.

From the above discussion it should be clear that an understanding of the general nature of generator circuits combined with a wiring diagram covering the system on the particular car in question should enable the electrician to handle any case of electrical trouble and locate the cause of same.

Teach Fuel Economy Through Proper Gear Shifting

WHEN you sell a man a car don't tell him that "she will take all the hills around here in high."

Many an overzealous salesman has made a poor driver out of a customer who otherwise might have been quite skillful in handling his car by neglecting to instruct him in the proper use of the gearshift lever.

The car maker has put the gearset in his car so that the driver might get the maximum performance from his engine at all times regardless of road conditions. The internal combustion engine must be kept turning over at a proper speed in order to propel the car. Revolutions and plenty of them are needed at all times. Especially is this true on hills. It not only saves the wear and tear on the entire car but it means a saving in fuel also.

Instruct your customers to shift gears on a hill early enough, before the engine starts to labor and slow down. The skillful driver will shift into second gear on a steep hill and do it so gracefully that the car will not loose any of its momentum. Nor will the passengers be aware that the shift has been made.

The American Highway Educational Bureau in co-operation with the good roads bureau is disseminating the results of tests recently conducted by the Iowa State college in co-operation with the National Research Council. The tests showed that the average motorist does not shift his gears properly when he takes a hill.

The conclusions reached show that the average motorist waits too long to shift from high to second, thereby losing speed and overtaxing his engine and also consuming more gasoline. Exact instructions for the most economical driving will vary with the make of the car or truck but the general admonition, if accepted, not to slow down to less than 8.5 miles an hour before shifting will mean a considerable saving in gasoline consumption.

The tests also showed that in going down hill it is cheaper to retard the speed with the brake than by leaving the clutch in. Free coasting should begin so as to attain the maximum desired speed at the foot of the hill and continue for a distance to take advantage of the momentum attained.

The vehicles used in the tests were equipped with an ingenious device which makes a continuous record of the gasoline consumed as the vehicle moves over the road and another which makes a simultaneous record of the speed at every instant. The specially equipped vehicles, both trucks and automobiles, were driven over the various sections of road, taking the records of the gasoline consumption and speed with the two instruments described, the rate of fuel consumption and speed for each trip being on a graph with the profile or grade of the road.

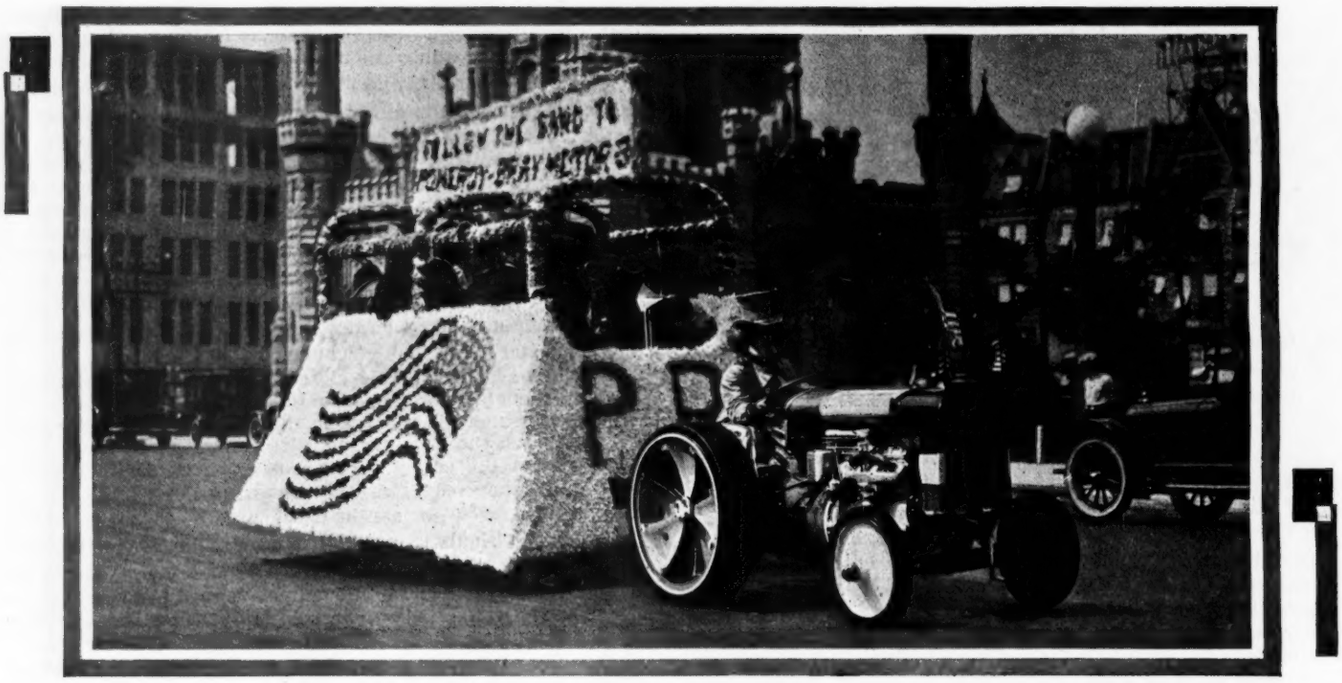
DOING ONE THING WELL

The good mechanic does not only do his work well, but sees to it that his equipment and surroundings are in keeping with the quality of his work. He sees that the floor around him is clean. His bench is orderly; he has on hand only the tools he knows will be used on that particular job.

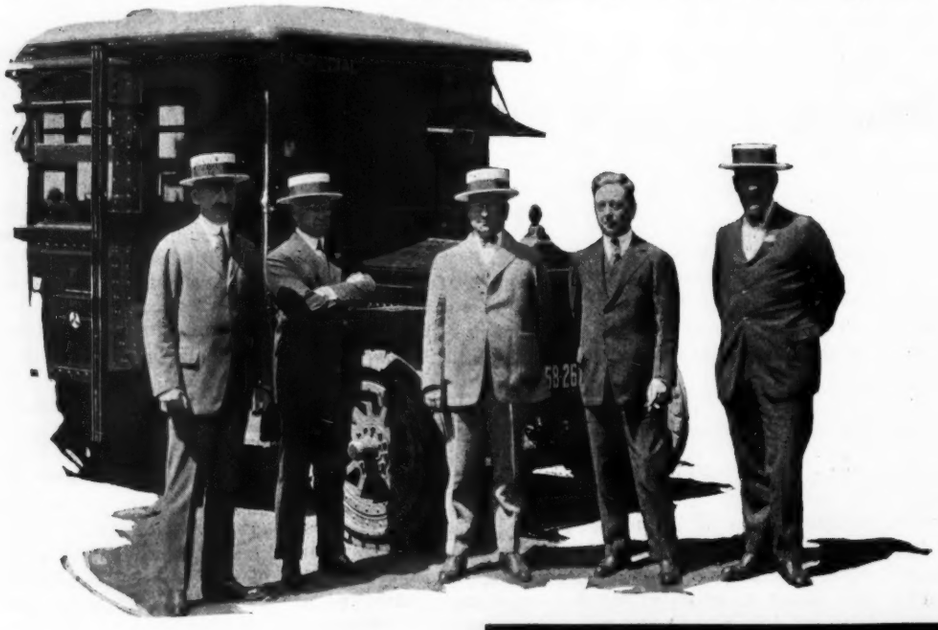
The thing we wish to impress here is that the careful mechanic cleans up after each job. He sweeps the bench of filings or chips. He restores twist drills to their proper racks, cleans the files of chips, wipes chisels, hammers, punches, etc., clean of oil, and returns any unused nuts, bolts, cotter pins, and parts to receptacles made for them. Finally, he wipes the top of the bench, washes his hands and thus is all set for the next job.

It always pays to start with a clean slate.

MOTOR AGE'S PICTURE PAGES



This is another one of the prize-winning floats which participated in the Ford Day Parade at Chicago on August 10. It was entered by Pomeroy-Bray Motor Sales Co. and was done in red, white and blue with "Uncle Sam" at the wheel. The words "Follow the band to Pomeroy-Bray Motor Co." were worked on the upper deck



Selden-Atlas Officers at Rochester Conference—(Left to right) Wm. C. Barry, Jr., First Vice-President, Selden Truck Corporation; R. H. Salmons, Vice-President, Selden and also Vice-President, Industrial Motors Corporation; H. T. Boulden, Selden Vice-President and Director of Sales of Industrial Motors; George C. Gordon, President, Selden Truck, and Vice-President, Industrial Motors Corporation

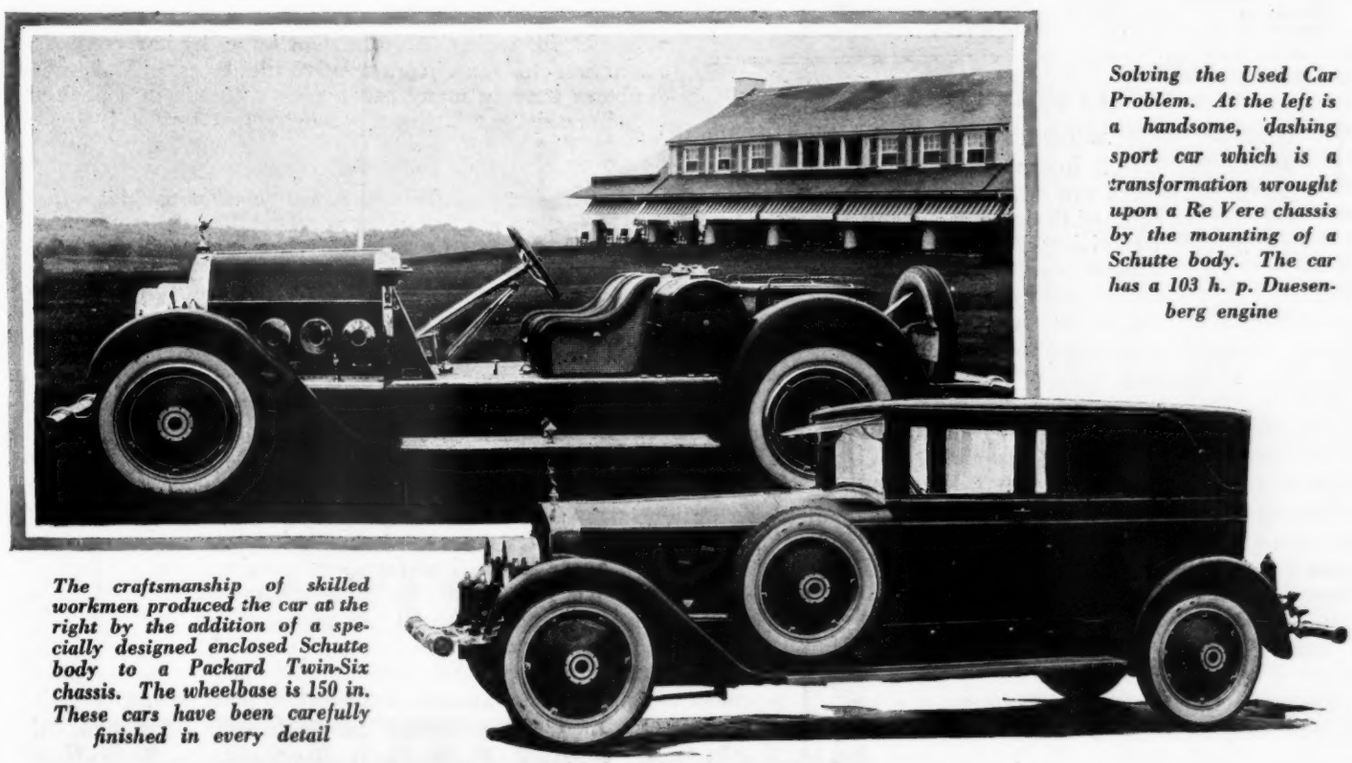
This windshield sticker is being put on automobiles throughout Chicago at the initiative of the Chicago Automobile Trades Association, which hopes thereby to make motorists more considerate of the rights of pedestrians and other motorists. Incidentally, the success of the movement would eliminate the cause of many an accident and promote public good will toward the automobile

OF AUTOMOTIVE INTEREST

The new and the old in automobile advertising. The contrast between the two cars is no greater than that between the passengers they carry

No Accidents with
The Oldsmobile
Mechanical skill and mathematical exactness eliminate the danger of the horse's uncertain temper, sudden fright and unruly disposition—no "Runaways" with "The Best Thing on Wheels."
The controlling mechanism is simple, strong and instantly responsive to the will of the driver, giving a sense of perfect security. There is no factor of uncertainty in the Oldsmobile—"Nothing to watch but the road."
Price $650.00
Equipped with a motor, running 30 miles on one gallon of gasolene, an improved mixer which guarantees a uniform charge and perfect explosion every time, and strong trussed axles. Call on any of our 50 Selling Agencies or write for illustrated book to Dept. K.
Olds Motor Works
Detroit, Mich.

Do you remember what a curio this advertisement was when it was first printed? The Olds Motor Works celebrated the twenty-fifth anniversary as a manufacturer Aug. 21. This was one of the first advertisements



The craftsmanship of skilled workmen produced the car at the right by the addition of a specially designed enclosed Schutte body to a Packard Twin-Six chassis. The wheelbase is 150 in. These cars have been carefully finished in every detail

Solving the Used Car Problem. At the left is a handsome, dashing sport car which is a transformation wrought upon a Re Vere chassis by the mounting of a Schutte body. The car has a 103 h. p. Duesenberg engine

MOTOR AGE

Reg. U. S. Pat. Off.
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As to the Secretary

IN talks with dealers located in various sections of the country one often hears expressions that indicate that these dealers are not exactly satisfied with the secretary or manager of their dealer organization. This, perhaps, is not surprising in one way, but when you talk with these dealers about their part in the association work, you find that they believe that the secretary or manager should be a sort of superman who can do many things for them, or, as Col. Clifton once put it, "A Moses to lead the automotive men out of the wilderness."

This expectation on the part of the members of an association is entirely unfair to the secretary. An association can seldom be more than the members make it. These members employ a secretary or a manager, pay to him a much smaller salary than most of the members make out of their business, and then turn him loose to handle the least understood, and often most important, part of their business.

It is not fair to this man to expect him to initiate and carry out great projects, although many of the secretaries do that very thing. They often bring about conditions that save to their members considerable sums of money, but as this is a saving and not an added profit, they do not get as much credit for it as the salesman who sells a car a week, although this saving will automatically go on the books year after year.

An association cannot be bigger than its members. A manager cannot be expected to be a superman. He should be able to initiate some activities and he should be able to carry to conclusion suggestions made to him. But to expect a secretary, alone and unaided, to remake the automotive dealers of a community is too much.

The attitude toward an association is too often entirely selfish and thankless. Recently an association membership that cost a dealer $10 enabled this man to have returned to him more than $400 that he considered lost. This man refused to renew his membership the next year, saying that as he had learned how, he did not need the association.

If your sales appeal is price only, you are on the wrong road or you have the wrong merchandise.

Two Sides of a Victory

THERE is not a great deal to say about the aftermath of the Chicago street car strike. It seems that no one was surprised that the automotive vehicles were able to carry on the business of the country's second largest city in a very acceptable manner. In fact there appears to be more surprise that the street cars even started again.

This result is a testimonial, of course, to general acceptance of the automotive vehicle by the public. It would appear to an observer that, if any fault is to be found, the automotive vehicle is rather oversold to a great part of the public. In Chicago, at least, many persons are wondering why the mayor or some other person did not wave a wand and create enough busses to carry all of the traffic and rout the street cars and elevated lines.

Despite a duty well done during the recent traffic interruption, the automotive vehicle has left a taste of disappointment with some enthusiastic admirers. This disappointment, however, is more than offset by carrying of a conviction to some conservative doubters. And these doubters were in many cases, men who are in a position to help or delay a business advance.

The accessory dealer who is not familiar with standard mail order house offers does not know his competition.

The Tightwad and the Well Managed Shop

TO the question, "What is a Tightwad?", there may be as many answers as there are persons who read these lines, but all will agree that the Tightwad will not buy anything for a dollar, if he knows of some other place where it can be had for fifty cents. Furthermore, the place that sells the thing for the lower price does not have to worry about getting paid, for the Tightwad always has the cash.

This is the man who repairs his own "bus" in the alley, evenings, because he can save money doing it, and doesn't care to gamble to the extent of running his car into a repair shop, taking a chance on the number of hours they will soak him at $1.50 per. Moreover, his point of view is readily appreciated by the mass of motorists, and also by the more progressive shops that

have to some extent come to see the other fellow's point of view as a matter of business necessity, if for no other reason.

The day is at hand, however, when the alley will be used less and less by the Tightwad for in common with all of us he has a business of his own in which his time not only has a certain definite value, from a commercial standpoint, but also has a concrete value for recreational purposes. Two things are bringing this time nearer and nearer, one being equipment in the up-to-date repair shop, which is taking the guessing out of time estimates, and the second is like unto it, a flat rate system of estimating charges, which enables the Tightwad to know in advance what his bill will be. When for example, he has been in the habit of cleaning out the carbon and grinding the valves, in spite of the fact that it took him five hours, and caused him to lose what religion he may have had, he will be a willing convert when he finds that this job can be done for less dollars than the time it takes him would be worth in his business. Then, being still a Tightwad, he will go to the shop for his work, just as before he consistently stayed away, for if he values his time at $6 and the job costs him $4 or $5, he will always choose the method where he stands to win.

In this particular case, the job in the shop is accomplished with the aid of speedier wrenches, valve spring lifters that really lift, motor driven grinders and similar appliances, combined with the experience of a man who does so many of these jobs that he unconsciously reduces lost time to a minimum, while the individual car owner on the other hand has neither the equipment nor the experience.

This cash business is available to those who are awake to the opportunity made possible by up-to-date equipment and real business methods, and the profit is not only on the individual job but on the sale of supplies that each extra customer makes possible, to say nothing of the reduction in overhead costs that comes with an increase in the number of jobs being handled per day.

Business built on price alone is a house built on sand.

"Who's Afraid?"

JUST outside of Gary, Ind., there is a garage which from all outward appearances has no other title but "repairs." However well this place is equipped within, we do not know and never shall, but against the wall on the outside there is a free air hose and when passing the place the other day we had occasion to use this hose.

A sign told us to "please put hose back when finished," which we fully intended to do whether the sign was there or not. The slow leak that was in our tire had expanded, however, and it was necessary to make a change. We left the hose at our feet and were about to go into the garage to ask a man to change the tire for us, when a mechanic who might have been a heavyweight fight champion came out with something like fire in his eyes.

"Hey, you!" he challenged, "can't you read that sign there?"

We looked where he pointed and, frightened as we were at this man's attitude, we found ourselves saying, "Yes, but it says 'when finished.'"

Our garageman scowled, "Well, be sure you put it back," he said, and sauntered back into the place. Of course, we changed our own tire, because we were actually afraid to ask this man to do it for us.

Now that we have recovered from our fright and are safe back in the office, we are able to think of how nice it would have been for everyone had this man been civil. He would have had the tire changing job and without half trying could have sold us some rubber cement, those two spark plugs which we needed, and gas to get back home with.

Many dealers tie up their profits by over buying.

Courtesy

THE members of the Chicago Automobile Trade Association should be congratulated for their forward step in the promotion of the "Automobile Courtesy" campaign. This takes the form of distributing windshield pasters and letters calling attention to almost universal faults on the part of the motorist.

Proper appreciation of courtesy on the part of the motor car driver would do very much to cut down the sales resistant list of accidents. Courtesy means many things, in addition to the little things that make life more pleasant. A lack of courtesy is making the Chicago boulevards walls against the pedestrian and is creating a frame of mind on the part of many persons who pay taxes. If the motor car driver continues to abuse the privileges extended to him, these privileges are likely to be curtailed.

A proper appreciation of courtesy takes into consideration the rights of others and causes a motorist to dim his lamps and avert such accidents as happened on a Chicago suburban driveway the other night in which two cars were wrecked and two men sent to the hospital.

Automotive dealers can well afford to take an active interest in promoting courtesy, as well as defining it.

A business that is not advertised is likely to be no business at all.

A Hint About News

SOME very interesting romances have appeared in the financial columns of the newspapers recently as to the doings within the automotive business and of the struggles for supremacy that the writers see going on. Most of these romances are based on recent price reductions and the only thing that these writers can see in the adjustments is an effort to put all rival manufacturers out of business.

It is just as amusing to note how these writers rank the companies in importance in their articles. In most cases, a company that has not permitted its stock to be sold on the open markets does not amount to much, in their opinion, regardless of the number of cars made or the long and honorable history of this company.

A good many men interested in the automotive industry take these financially inspired stories too seriously. It is only fair to say that the writers of the stories are quite honest and that they endeavor to pass on the information that they believe to be correct. The trouble is that they view the industry from without and they do not understand the honesty, the dynamic force or the modern methods of this industry. It is in the proper interpretation of movements within the industry that the business papers do their best work.

Government Coal Action Disputed

Manufacturers Indignant at "Non-Essential" Classification

Protest Against Priority Ruling May Follow Production Slowing

NEW YORK, Aug. 21—The inconsistency of the Government's coal priority ruling, classing the automotive industry as non-essential, on the one hand, and of a public demand for motor transportation which is speeding up motor truck production, on the other, is causing a feeling of indignation among automotive manufacturers which may reach the stage of formal protest against the priority order if the threatened coal shortage becomes actual through a continuance of the railroad strike.

So far no curtailment of automobile, truck or parts production has been necessary, as day to day receipts of coal in the Detroit district, heart of the industry, have maintained the situation just about where it was two weeks ago. But with rapidly gaining demands for trucks and in some cases for passenger cars to do the work of partially crippled railroad lines again emphasizing the utilitarian character of the industry, its leaders naturally are chafing under the non-essential label.

With the electric power company in Detroit making no discrimination against the automotive industry or any other class of users and with coal in small quantities but steadily reaching the district, production is showing no more than a seasonal decline from the record-making figures of May, June and July.

Reports from various sections of the country show a logical mid-summer stagnation of passenger car sales in the larger industrial and mercantile cities, but buying is gaining in the agricultural sections. Indications are strong that unless a continuance of the railroad difficulty adversely affects general business conditions the country's automobile makers and merchants will have a fall and early winter business vigorously holding its own on a basis of seasonal comparison, with the huge sales of the spring and summer.

The price reduction flurry apparently is all over. With one or two exceptions lowered prices were confined to the big production field. One or two makers have slightly increased their prices. Generally, indications confirm the earlier forecast that manufacturers whose quantity production justified lower prices without sacrificing fair profits have set their lists for the remainder of the year and that the rest of the builders will rely on new models or public acceptance of current models for their sales appeal from now until the 1923 shows.

New models for 1923 are making their appearance every week. The list already is quite formidable and will continue to grow until the closed car shows of September and October, when most makers will have finished their alterations in chassis and body design until the advent of the mid-winter shows. As in the past, a good many of the 1923 cars now offered to the public will stand without change for a twelve months' period. The growing recognition of the closed car as the year round car is giving impetus to the making up of a long list of fall shows which will foster this movement.

It seems certain now that the automotive industry will go through to the end of the year making substantial profits for its widely scattered stockholders, giving employment to its workers on virtually a 100 per cent basis and providing business for many industries which but for the patronage of the motor vehicle makers would have put in a disastrously slim year.

Michigan Bus Operators to Test Rights in Court

PONTIAC, Mich., Aug. 19—The Inter-City Safety Service Bus line has placed orders for ten new motor busses, with a carrying capacity of 21 passengers each, to run on lines out of Detroit to Pontiac, Flint and Highland Park. These busses will supplement an initial equipment of two, which have been tried successfully on the Pontiac run, according to E. B. Davis, president of the company.

Development of motor bus transportation on the paved ways out of Detroit is being rapidly pushed, particularly in this direction and is furnishing keen competition for interurban electric lines.

The use of busses has led to several attempts to regulate their use in villages, with the result that numerous ordinances have been passed, fixing license fees. Two companies operating between Detroit and Pontiac have decided to make a test case of an ordinance passed in Birmingham, a village on their route, which fixes an annual license fee based on the carrying capacity of the machine. Under the ordinance, all drivers for the companies were arrested and haled to court, where a contest is to be put up.

BURNS QUITS USED CAR BUSINESS

DECATUR, Ill., Aug. 19—B. B. Burns, president of the Illinois Automobile Trade Association, has disposed of his used car business, in which he was exclusively engaged here, and will take a vacation before announcing his future business plans. He sold his lease and part of his equipment to Porter & Watkins, Hupmobile and Oakland dealers, and closed out his stock of used cars.

Improved Road Mileage to Be 40,000 by July, 1925

Rapid Progress Reported on Large Number of State and Federal Projects

WASHINGTON, Aug. 19—Progress report on the Federal aid highway construction program, shows that on July 31, last 14,348 miles of highways had been completed and paid for; 3,951 miles completed and not yet paid for, and that 14,918 miles are under construction. Of the last named figure the projects are 56 per cent completed.

Reports made to the U. S. Bureau of Roads show that the states completed 600 additional miles of good roads during the month of July. Including projects not yet under construction but which have been authorized under Federal aid, approximately 40,000 miles of road building comprise the Federal-States program for the period ending July, 1925.

The state of Louisiana ranks first in the progress being made on good roads under construction, her program having been 89 per cent completed. Her program contemplates the construction of 254 miles of good roads during the fiscal year ending July 31, 1923. Maryland, the figures show, is at the bottom, with a program of 29.7 miles, of which but 15 per cent is completed.

The largest amount of construction on roads is being done in Texas where 1,484 miles are under construction. Iowa comes next with 1,043 miles, and Nebraska is a close third with 985 miles. In the state of Rhode Island but 6.6 miles are under construction for the year, of which 55 per cent have been completed.

Power Farming Parade at Minnesota State Fair

MINNEAPOLIS, Aug. 19—The Northwest Tractor Trade Assn. has arranged with the board of managers of the Minnesota State Fair for a power farming equipment day to be held Friday, Sept. 8. The principal feature of the day will be a parade, entitled "Pageant of Progress in Power Farming," on the fair grounds and the race track in the afternoon.

The parade will be open to all power farming exhibitors at the fair who observe the rules of the committee.

ENGINE PRICES REDUCED

INDIANAPOLIS, Aug. 18—A new schedule of prices has become effective on all sizes of Midwest engines. These prices in some cases have, on definite quantities, as much as a 33 1/3 per cent reduction.

Enclosed Car Sales Gain Rapidly

August Keeping Pace with July in Chicago District

Slight Decline in Some Lines; Others Selling Up to Season's High Mark

CHICAGO, Aug. 21—It is the general opinion of close observers of retail automobile sales in and around Chicago that whatever effect the recent price reductions of a number of lines had was to slow up sales and that in the slowing the lines reduced suffered as much or more than other lines. Sales have fallen off so slightly, however, that it is doubtful whether any of the decline should be attributed to the price reductions. Certainly a seasonal slump of some degree was due after the unusual selling of June and July, and, all things considered, the decline in sales has been less than was expected and by no means enough to be called a slump.

Some of the more popular medium-priced cars are selling as well as at any time this season. The Chicago agency for a well-established make selling under $1,000 is just as far behind with deliveries as at any time this summer and is now booking orders for delivery in 60 days. This company has lost many sales this summer because of this situation. A popular car in the high-price class which was announced this summer is now being sold in Chicago for delivery in December at the earliest.

Some of the agencies for popular cars are catching up with deliveries, and the ability of buyers to get fairly prompt delivery on the established lines has caused the cars not so well established to suffer some loss of sales.

The record of time sales compiled by the Central Automobile Finance Association shows that sales thus far in August have been almost up to the level of July. For the first two weeks of July the time sales numbered 1,973 and in the first two weeks of August the number was 1,892.

Sales of enclosed cars have been running unusually heavy. A dealer with a large number of orders on hand for delivery as soon as possible finds that the orders for open cars exceed those for enclosed cars by only 20 per cent. Another dealer in a position to make deliveries within two or three weeks is making 80 per cent of his sales on the enclosed models.

Salesmen, spurred on by the unusual buying spurt of the last few months, are working hard all the time and a new kind of salesmanship is the result. Few dealers are experiencing hard times selling their trade-ins, "because," explains one, "we are able to dispose of them at a price that does not startle the average used car buyer and because there is a better kind of cars being sold."

Medium-priced cars are leading the field in sales right now, with low-priced cars running a close second. Many dealers are already at work on a winter merchandising plan and it is a safe prediction that enclosed car sales this winter will eclipse previous records.

Accessory dealers and tire merchants report "wonderful times," with sales at the same high level that has prevailed since the opening of the season.

The "Mut" Motorist

SYRACUSE, N. Y., Aug. 21—The following article by A. M. Taylor, assistant advertising manager of the Franklin Automobile Co., was awarded first prize in a recent "knockers' contest" conducted by the Syracuse Journal:

I knock the mut motorist.

He leaves the curb without signal—stops suddenly in traffic without warning.

He uses his horn instead of his brakes in a street filled with playing children.

He steals places in traffic and "cuts in" regardless.

Overtakes and passes another car near the brow of a hill, or on a curve.

Stops his car on a curve in the road without getting out of the roadway.

He hogs the road.

His lights, are blinding, nor will he dim them—damn him.

He drives with a snoot full.

He is a curse—an abomination—an affliction to humanity.

I knock him.

BUSINESS MEN CLEAN UP

CHICAGO, Aug. 17.—Automobile maintenance stations on the southeast side of Chicago are engaged in a clean-up campaign, which will extend over a period of four weeks. The move was prompted by the West Englewood Business Men's Assn. and consists of a series of cleaning and painting jobs, one week being devoted to cleaning one department, the next to cleaning another and so on until the work is completed. Every member of the association in every line of business has pledged himself to full cooperation and the result is "a better place to do your buying "—the slogan of the campaign.

KENTUCKY WAGON MFG. CO. SUED

LOUISVILLE, Ky., Aug. 19—An intervening petition in a bankruptcy suit against the Kentucky Wagon Mfg. Co. was filed here by W. T. Godfrey, attorney for the Kentucky Title Savings Bank & Trust Co. Other creditors recently stated they were willing to drop the bankruptcy suit and accept terms of a merger into the $80,000,000 Associated Motor Industries, of which the wagon plant is a part. The bank has a claim for $45,000.

Lower Prices Give Slight Stimulus to Milwaukee Trade

Slowness of Deliveries Hurts Business in Some Lines—Used Cars Cheaper

MILWAUKEE, Wis., Aug. 21—While reports of retail trade following the formal announcements of 1923 models and new prices are conflicting, on the whole dealer trade has undergone a very respectable stimulation in the past week especially. As a rule, those who have not felt this betterment in demand are dealers representing cars that have not been reduced.

A good many people who did not buy passenger cars last spring during the big rush find eminent satisfaction in new models and prices and are beginning to place orders. Trade, however, probably will not get into a real swing until dealers are better able to place cars into the hands of purchasers at the time of closing the deal. Quantity deliveries of new cars as yet are slow, which is true particularly of enclosed types. At the same time the demand for enclosed cars is relatively much heavier than at any time in the history of the business. It is a matter of much favorable comment among buyers that manufacturers have succeeded in bringing the cost of enclosed types closer to the price of open cars, and many people are buying coupes and sedans who felt they could not afford them when the difference was so great as it has been up to a short time ago.

As might be expected, dealers in cars that have not been reduced in price encounter constantly the expression of a conviction on the part of their prospects that they will be able to buy more cheaply later. And, as usual in the case of general reductions by large quantity producers of the best-known cars, some people insist that the "end is not yet" and they intend to hold off a little longer to see if the price of their favorite is actually reduced further.

The used car situation has been aggravated further by the new buying movement and the market is virtually flooded. However, allowances made by dealers have dropped sharply with the trend of new car prices, encouraging the market to some extent. Almost every vacant lot at advantageous intersections is being used as a curb market, prejudicing to some measure the more orderly and substantial effort of legitimate dealers to merchandise their large stocks of used cars.

ACCESSORY DEALERS ORGANIZE

ROCHESTER, N. Y., Aug. 19—Permanent organization of the Rochester Tire & Accessory Dealers' Association has been effected. Henry J. Rowerdink has been named president; Frank W. Hahn,

Higher Prices Announced For New H. C. S. Models

Open Cars Advanced $75 and Enclosed Cars $325 and $400 —Many Changes Made

INDIANAPOLIS, Aug. 18—The new H. C. S., known as Series IV, is announced by the H. C. S. Motor Car Co. Mechanically, the new job has many refinements in motor, chassis and body. In the motor more power has been secured by enlarging the bore from 3⅝ to 3¾ in., while the pistons have been lightened and the connecting rods improved. The gear ratio has been lowered, and to the ignition system has been added an automatic spark advance. The Brown-Lipe transmission and clutch have been adopted. The rear axle, too, is new, two double rows of annular ball bearings now being used in the rear of the main driving pinion instead of one and to avoid sticking brakes strong pull-back springs have been added.

Body changes are many. All the seats are wider and the backs higher, with deeper upholstery, with Marshall upholstery spring making for easy riding quality. The floor boards of the tonneau have been leveled for more leg room. There is a large rectangular plate glass window in the rear of the passenger compartment and an option of black enameled or dual toned hand buffed leather is given in the open models and of mohair or broadcloth in the enclosed ones.

The new list prices show an increase of $75 on the open models and $325 and $400 on the enclosed ones. It is as follows:

	Old Price	New Price
2 pass. roadster	$2400	$2475
4 pass. phaeton	2400	2475
Sport sedan	2850	3250
Standard sedan	3150	3475

NEW LIBERTY COUPE

DETROIT, Aug. 17—The Liberty Motor Car Co. announces a new model, the Commander coupe. The body is a distinctly two passenger design, the seating arrangement being side by side. The upper part of the body is a substantially constructed steel covered unit. There are two doors, the width of which is 22 inches. The door pillars are of wood, covered with steel. Disc steel wheels are standard and the equipment includes such items as courtesy lights, water indicator, special radiator filler cap, visor, clock, cigar lighter and windshield wiper. The coupe is priced at $1695.

OAKLAND PLANS LARGEST MONTH

PONTIAC, Mich., Aug. 19—With a temporary lull during August, while shifts are made in manufacturing arrangements at the plant here, the Oakland Motor Car Co. is preparing to have in September the biggest production and sales month of the year, according to W. R. Tracy, assistant general sales manager. Orders are being received far beyond expectations when announcement was made a month ago that autumn business was expected to surpass that of the spring of 1922, he says, and the only difficulty confronting the factory is means of getting material into the shops, due to the railway tie-up. The plant has not thus far been handicapped by lack of fuel, and anticipates no shut-down on that score.

More Liberal Licensing Planned for Georgia Dealers

ATLANTA, Ga., Aug. 18—The Georgia Senate committee on public roads has recommended a bill for passage by the Georgia State Legislature, now in session, amending the present motor vehicle law in order to permit automotive dealers in the state to use their license tags for business purposes other than demonstrating, and to provide that additional tags may be obtained from the Secretary of State by the payment of $10 for each tax. Dealers, under the change, must also furnish the secretary with the signature of reputable witnesses before the dealers' tags will be issued. Passage of the bill, which seems assured, removing unfavorable restrictions that have had somewhat of a deteriorating effect on sales, will prove a big advantage for the dealers.

105 AUTOMOBILES BURNED

BUFFALO, Aug. 21—Fire on Aug. 15 destroyed the garage of the Chautauqua Institute at Lake Chautauqua, causing loss of more than $250,000. In the garage were 105 automobiles which were destroyed.

Chautauqua campers were aroused soon after the blaze started and moved more than 350 cars, which were parked outside the garage, to places of safety.

WESTERN TIRE MAKERS MEET

CHICAGO, Aug. 19—The monthly meetings of the Midwest Rubber Manufacturers' Association were resumed here this week when representatives of 35 firms met at the Morrison Hotel. The meeting was presided over by W. W. Wuchter of Omaha, president of the association. Recent price reductions by the large tire makers were discussed informally. Production by the firms represented at the meeting is being maintained satisfactorily, it was said.

TRACTOR SHOW TO BE HELD AT CHARLOTTE, N. C.

CHARLOTTE, N. C., Aug. 22—An industrial tractor show, the first ever held in the Piedmont section, will be held in Charlotte, Sept. 6-8. The show is being given under the auspices of the Charlotte branch of the Ford Motor Co. and the Ford dealers of North and South Carolina and Southern Virginia. Fifty or more manufacturers will be represented by their products.

Chicago Elevated Lines to Try Busses as "Feeder"

Recent Strike Proved Practicability of Motorized Transportation

CHICAGO, Aug. 21—Plans for the operation of busses to supplement its electric railway service are announced by the Chicago Elevated lines. This step involves a recognition by the management of the elevated lines of the utility and convenience of the bus for passenger transportation, so capably demonstrated during the recent strike on the street and elevated railway lines, and indicates a determination to take advantage of the bus as a feeder for the electric lines.

Three bus lines are proposed for the inauguration of the service and to begin with 14 busses will be operated on these routes. The bus routes begin at the end of three elevated lines and extend from one to two and a half miles through well populated districts.

The bus lines will be an integral part of the elevated service available to the passengers without extra fare. Transfers will be issued from busses to electric trains or from trains to busses.

It is estimated that probably 40 busses will be required when the service is fully developed. The company expects to use busses seating about 25 passengers, lighted and heated by electricity. Formal application has been made to the Illinois Commerce Commission and to the city authorities for permission and license to operate the busses.

ANTI-BUS BILL TABLED

ATLANTA, Ga., Aug. 21—The bill introduced before the Georgia State Legislature by the short line railroads seeking to have the motor bus declared a common carrier subject to the rules and regulations of the State Railroad Commission, will not become a law this year. It came up for a final hearing before the senate last week, and by an overwhelming vote was tabled.

Lexington Motor Company Bulletins Stolen Cars

CONNERSVILLE, Ind., Aug. 17—Lexington Motor Co. has inaugurated a bulletin service to aid Lexington owners in the recovery of cars which are stolen. The company supplies its dealers and insurance companies with printed forms upon which they are to report the theft of Lexington cars, giving name of owner, description of car and place from which it was stolen. The Lexington company will then fill out the necessary number of duplicate forms and mail them to all Lexington dealers and to insurance companies.

July Better Sales Month In Buffalo (N. Y.) Than June

Street Car Strike Gave Automobile Business Slight Stimulus—"Jitneys" Furnish Transportation

BUFFALO, Aug. 21—Buffalo's automobile dealers, according to Carlton C. Proctor, executive secretary of their association, are very well satisfied, thank you, with the business they have done so far this year, and are correspondingly pleased with the fall trade outlook.

July's business ran ahead of that done in June, which had showed some falling off compared with that of May, which was slightly less than the volume in April, the banner month of the year. It is interesting to note that of the total sales recorded in July 96 per cent were made by Ford dealers.

Some of Buffalo's retailers complain of being unable to get deliveries from their factories on certain models, and say the volume of their July sales would have been considerably greater if their factories had been able to supply their demands. These dealers sell cars among the more popular in the medium priced division.

Dealers here say they have no kick to make on the present condition of the used car market. They have been able to work off most of the used cars which they had on in stock at the beginning of the year, and they say the demand is preventing accumulation of used cars.

Buffalo's street railway strike, which has been in progress since July 2, and which shows no signs of cessation, has stimulated slightly the demand for the cheaper grades of used cars, these being desired for jitney service.

Even since the International Railway company, Buffalo's street car line, has resumed partial car service Buffalo folk have shown strong inclination to cling to the jitneys with the result that the "jitleggers," as the drivers of these cars are dubbed, have been reaping a harvest. However, two Supreme Court Justices have ruled that the operation of the jitneys is illegal, and though they have been running since these rulings were made the outlook is now that they will disappear soon from Buffalo's streets.

One result of the use of the jitneys for strike service has been a harvest for the repair men, collisions having been numerous because of the disregard for traffic rules and road regulations shown by the drivers, who in their haste to rake in dimes have driven furiously here and there and everywhere.

FIRM CITED DENIES CHARGE

WASHINGTON, Aug. 19—Charging that in the assembling of automobile trucks it used worn or second-hand parts and sold the completed product as new trucks without disclosing the true origin and facts concerning the building of the trucks, the Federal Trade Commission has issued a complaint against the Lease Motor Co., Inc. The complaint also is directed against its subsidiary the Acoma Motors Co., Inc. Both companies are located in Long Island City.

NEW YORK, Aug. 21—"The Lease company will put in a defense on Sept. 28," says Robert Lease, president of the Lease Motors Co., against which the Federal Trade Commission has issued a complaint, charging the use of worn or second hand parts in the assembling of trucks which later were sold as new. "We deny the charges. I feel that they originated with a couple of export houses with which we have had some friction. We build trucks and we never have used worn or second hand parts in their construction, as charged." The Lease company has been in bankruptcy since April 1, with Eli Newman as the receiver. It is about to be sold to a new concern, the Panther Motor Truck Co., which will manufacture trucks in the Long Island plant.

1100 Per Cent Sales Increase at Atlanta

ATLANTA, Ga., Aug. 21—The Atlanta branch of the Willys-Overland Co. announces that Overland sales the past few months in the district covered by this branch have been more than 1100 per cent better than during the same period in 1921. The increase for the entire south is something more than 400 per cent over the same period in 1921.

VELIE DEALERS ORGANIZE

MOLINE, Ill., Aug. 18—Distributors and dealers handling the Velie cars have formed a permanent national organization. At a largely attended meeting held here recently the following officers were elected: President, J. K. Gregory of the Gregory Motor Co., Kansas City; vice-president, A. J. Shorey of the New England Velie Co., Boston; secretary, R. C. Cook of R. C. Cook Co., Chicago. The purposes of the organization are defined as "close and active co-operation in expanding the market, the interchange of management and sales methods and ideas and the promotion of common interests."

NEW STEPHENS SALES MANAGER

MOLINE, Ill., Aug. 17—The appointment of O. P. Robb as vice-president and sales manager is announced by Stephens Motor Car Co. For a number of years Robb has been a sales executive for the Moline Plow Co. At various times he has served as manager of the Moline Plow Co.'s branch houses at Winnipeg, Kansas City, Dallas, Omaha and Los Angeles.

W. A. Biss, Jr., will continue as assistant sales manager of the Stephens.

OVERLAND NO. 900,000

TOLEDO, O., Aug. 17—Overland car No. 900,000 was produced at the Willys-Overland factory Aug. 11. The company is looking forward to the 1,000,000 mark.

Oldsmobile Company Started Production 25 Years Ago

Interesting Story of Beginning of Concern Which Has Just Celebrated Anniversary

DETROIT, Aug. 22—The twenty-fifth anniversary of the formation of the Olds Motor Works was celebrated yesterday. It was on Aug. 21, 1897, that Ransom E. Olds and Frank Clark of Lansing, Mich., both young men, incorporated a company for the manufacture on a commercial scale of an automobile with which they had been experimenting for two years.

Young Olds worked for his father who was a maker of gas engines and Clark was learning the buggy manufacturing business from his father. The one was to furnish the engine and the other the body and carriage work. They produced their first automobile in 1898, a year after the incorporation of their company. Shortly after this, Clark sold his interest in the factory they had established in Lansing to Olds, who went to Detroit for more capital.

A reorganization was effected and a factory was built in Detroit, a beginning from which this city has grown to be the greatest automobile manufacturing center in the world.

The early production records are interesting. In 1900 the company produced 1,400 cars and in 1901, the production was 2,500. In 1913 the Oldsmobile established a speed record at Daytona Beach, Fla., and the same year it won the Tour de France.

Olds left the company in 1904 and with H. T. Thomas founded the Reo Motor Car Co. The medium priced four-cylinder Oldsmobile was brought out in 1906. In 1910 the company was acquired by W. C. Durant for the General Motors Corporation of which it is now a division.

TO MAKE ROTARY ENGINES

BUFFALO, Aug. 20—A certificate of incorporation has been filed here by the Champion Rotary Motors of Buffalo, with a capital of $6,000,000. L. F. Lindal, a Buffalo attorney who is one of the incorporators, said the new firm plans to manufacture rotary engines. He said a plant would be erected or purchased here, but declined to make any further statements. The incorporators, Mr. Lindal, L. F. Donnelly and D. J. O'Neill, have opened offices in the Erie County Bank building.

DEALERS SEEK FREIGHT ADJUSTMENT

PORTLAND, Ore., Aug. 22—Equalization of carload minimums on shipments to the Pacific Coast will be sought by the automobile shippers of the Northwest as a result of action by the Automobile Dealers' Association of Portland, which has employed traffic experts to take the matter before the Interstate Commerce Commission.

"Key" Window for Chevrolet Dealers

Detroit Sales Branch Works Out Elaborate Display for Others to Copy—New One Each Month

DETROIT, Aug. 21—Chevrolet Motor Co., through its retail sales branch in the General Motors building, this city, is developing a plan to emphasize the convenience of the automobile in making life's pathway just a little more happy than it ordinarily would be.

In the windows of the branch the automobile will be shown in a different setting each month— a setting based upon seasonable conditions, in which the car is the important factor in making possible a change to the scene unfolded.

This window will be the key window for displays throughout the entire Chevrolet retail sales organization. Through its sales department the company will send photographs and complete descriptions of the scene depicted in the central windows. It is expected that replicas of the display can be used effectively by all dealers in cities of 50,000 upward.

On the scale that it is put on in the central windows it will cost about $1,000 a month. Reproductions of the scene can be put on at lower cost, as all show rooms will not have the window space that is available in the General Motors building, and where they have, the cost of reproducing will be lower than the cost of originating and designing.

The scene for August represents a midsummer bathing beach, where the automobile, a Chevrolet sedan in this instance, has enabled its occupants to seek out a sequestered beach, where bathing and its attendant pleasures might be enjoyed away from the usual summer crowds.

The cost of this scene was about $3,000, but it included the purchase of the wax figures, all the bathing paraphernalia and the various properties used, as well as the cost of originating and designing. Ordinarily this cost would have been reduced, as the plan of the company is to obtain the use of any costumes or properties required from stores dealing in these goods, and give credit for their loan by card displayed with the scene.

George E. Merkle, manager of the Detroit Chevrolet sales branch, is the originator of the plan for more appeal in the display of cars. By showing the part that a car may play in bringing variety in life, he declares the attention of persons who have never owned one may be better centered upon the advisability of getting one.

This plan of awakening attention can be used to the best advantage by a company handling cars in the low-price field, as Chevrolet is, because, in his opinion, it is in this class that the bulk of cars sold to persons buying their first is sold.

Displays of this kind lend themselves to showing the particular advantages of certain models, he said, the utility of the coupe in business, the convenience of enclosed cars in all sorts of weather, and for all occasions, and the comfort of the open models for ordinary uses. Though the trend of buying is steadily toward enclosed cars, approaching 50 per cent of all Chevrolet sales, the open models will always be favorites with many buyers.

Through the window route, it is hoped to persuade many spectators into buying the particular type of car that will fit into the general scheme of their desires.

This is Chevrolet's first "Key" window, after which every Chevrolet dealer is expected to model his display

TRADE COMMISSION OVERRULED

WASHINGTON, Aug. 22—Orders of the Federal Trade Commission which forbade the lease of gasoline pumps to retailers upon the condition that only lessor's oil should be used in the pumps have been set aside by a recent decision of the United States Circuit Court of Appeals for the third district upon application of the Standard Oil Company and a number of other oil companies. The court held that such a lease was not a tying contract which violated the Clayton Act. The court said that the public was not injured by the practice. As the retailer is free to install other pumps, the court held that the tying contract did not lessen competition to the extent contemplated by the statute.

MITCHELL FIVE-PASSENGER PHAETON

In the August 17 issue of MOTOR AGE the wrong caption appeared under the cut of the Mitchell car. This should have read "Mitchell standard five-passenger phaeton, which has a 120-in. wheelbase. The car is completely equipped and sells for $1790."

Earl Company Figures Annual Cost of Family Car is $465

JACKSON, Mich., Aug. 17—Figures showing the approximate annual cost of owning and operating an automobile for family use to be $465, have been prepared by Earl Motors, Inc. Following is the company's calculation showing how this figure was arrived at:

"Price of the Earl F. O. B. Jackson, $1095. Six per cent on this gives $65.70 interest on investment. The annual cost of tires, figuring tire mileage at 12,000 miles and estimating that the average family owning a car motors 5,000 miles a year, is approximately $58. The Earl averages 1200 miles on a gallon of oil. At $1.20 a gallon the annual cost for oil amounts to $5."

Gasoline is figured at $60 on the basis of a little better than 20 miles to the gallon. An allowance of $90 a year is made for repairs and upkeep. The largest item is depreciation, figured at $186.25 a year, as follows: The car is expected to give four years of good service, and then have a trade-in value of $350 to $400. Using the lower figure, subtracted from the original cost leaves $745 for total depreciation in four years, or $186.25 a year. The total of the various items is $464.95.

105,633 N. M. A. MEMBERS

WASHINGTON, Aug. 23—A total of 105,633 members in the recently organized National Motorists' Association were officially enrolled at a meeting of the Board of Governors at national headquarters, 911 Fifteenth street, northwest, this city, on July 27. This new membership is made up from clubs in all sections of the country.

National Tire Dealers State Their Platform to Factories

Report Progress Toward Acceptable Business Practices as Result of New York Conference

CLEVELAND, Aug. 21—Out of the meeting of the committee of The National Tire Dealers' Association and executives of the Rubber Association of America, which was held in New York City Aug. 9, will grow a spirit of co-operation that will result in the ultimate solution of the mutual problems of both, according to a statement made by R. F. Valentine, president of the National Tire Dealers' Association.

"We feel gratified that the opportunity was given us to present directly to the manufacturers the aims and objects of the National Tire Dealers' Association," said Valentine. "The reception accorded us and the consideration and discussion which was given the various merchandising problems was such as to indicate a sincere desire upon the part of the manufacturers to help dealers solve their problems."

Valentine would not at this time give details of the progress that was made. Arrangements were made, however, for future meetings to which both organizations will send representatives to discuss problems that arise.

The tire dealers were represented at the conference in New York by Valentine, R. J. Walters, of Baltimore, George J. Burger, New York City, and Frank Zeman, Chicago. The manufacturers had at the meeting Messrs. Shugart of the United States Tire Co., Mowe, of Kelly-Springfield, Broadwell, of Fiske, Miller of Goodrich, Plumb of Madison, Duncan or Hood, Phelps of Kenyon, DeLisser of Ajax, O'Neil of the General, Waddell of Goodyear and Fairbanks of Firestone.

The price question was not discussed at the meeting. The dealers made these requests: that the national and commercial accounts be eliminated; compel car agencies to sell all changeovers at regular list prices or turn the tires into the nearest branch at cost; increase the price of tires to the car manufacturers to a basis that will insure a reasonable profit and take away incentive for resale at retail; discontinue publication of all lists other than consumers' price list; classify retail distributing agencies and proportion the discounts in the ratio of the value of each classification—the retail hardware, drug, confectionery and grocery stores to be put in one class, the wholesale groceries, hardware and department stores to be put in another class and the legitimate tire dealer in a third class; to hold purchasers of equipment to actual requirements and effect such an arrangement that will absolutely prohibit these same car manufacturers and their agencies from disposing of any stocks at less than regular prices.

The dealers' program provides for the elimination of every tire whose quality is not proven, or where there is any question of the policy and methods of the manufacturer; an appropriation of not less than 2 per cent of gross business for advertising purposes and absolutely loyalty to the manufacturer whose goods are sold.

Quantity Production at Associated Motor Industries

CHICAGO, Aug. 18—Quantity production at the National Motor Car plant at Indianapolis, the Traffic Truck plant at St. Louis and the Kentucky Wagon Manufacturing plant at Louisville, where the Dixie Flyer automobile is made, was forecast by the visit just made to these plants by a group of officials of the Associated Motor Industries who have returned to Chicago.

Will I. Ohmer, chairman of the board, and Louis Ruthenburg, president, of Associated Motors, with technical assistants, spent a week at these plants outlining their part in the production plan of the merger and making the preliminary arrangements for them to produce their quotas.

"We are more than pleased with the progress that has been made," Ohmer said. "All the plants we visited were in splendid condition and arrangements necessary to fit them into the co-ordination plan of the merger were well under way. An assembling unit of Associated Motors is to be operated in connection with each of these three plants and we gave some time to preliminary planning of these buildings."

Other plants in the merger probably will be visited by the officials within the next week or 10 days.

TRACTOR SHOW GETS RESULTS

NEW ORLEANS, La., Aug. 19—Moving pictures of practically every detail of the Fordson demonstration at New Orleans were made for sale to Ford agents in this territory who will use them in their local theaters. H. L. Deas of the New Orleans branch of the Ford Motor Company estimates that 35,000 persons attended the show and demonstration during the three days and that it cost the dealers here approximately $3,000. Immediate results included the sale of 23 Anthony dump bodies, 12 units of graders, grist machines, etc., by the Oliver plow agency, 12 sets of rubber tired wheels, 12 Martin Parry truck bodies, five portable saw mills, two locomotive attachments, one hoisting winch, three trailers and seven tractors.

POWE WITH A. E. A.

CHICAGO, Aug. 18—The Automotive Equipment Association announces that W. R. Powe has discontinued his connections with all other organizations and will hereafter give full time as general traffic manager of the association.

Coal Situation Remains the Same in Detroit District

Edison Co. "Breaking Even" on Daily Supply and Shipments

DETROIT, Aug. 19—The coal situation is no better or worse in Detroit than it has been for three weeks past. Detroit Edison Co. reports that they are about breaking even at this time, receiving daily shipments in about the quantity required for daily needs. The resumption of work in many of the soft coal districts as a result of the Cleveland agreement is expected to end any difficulty in supply, the rub remaining, however, of getting it shipped.

The priorities ruling the the Interstate Commerce Commission which would deny power to non-essential industries, under which the automotive industry has been classed in Washington, has not been effective here, for the reason that no coal is being received through the agency of priorities yet. Though priority applications have been filed, most companies here are hustling for their own coal and any they are getting is through their own efforts.

Until such time as companies are unable to get coal except under the priority ruling, the automotive industry will continue to be supplied together with public requirements of all sorts. The Edison company will make no discrimination and there is possibility that conditions will not get any worse than now. This will mean that power users will be supplied in all their requirements.

Unless action is taken by Congress to put teeth into the power of coal administration, it is not expected that the priorities ruling will be generally effective. The attitude of the Louisville & Nashville railroad that it will be held responsible under contracts it has made to supply coal is the attitude of all roads, and unless the coal administration takes over the responsibility for such claims, railroads generally will contest its powers.

The possibility of employing truck trains to bring coal into the city has not been seriously considered, owing to the inaccessibility of most of the coal fields to truck travel. In a vital emergency it might be possible to bring in some coal to the city from districts not too far removed, but this would be only a measure of last resort. Getting empty coal cars to the mines is the big difficulty of the moment. Once the coal is in the cars most of the difficulty is over.

Executives in the industry are incensed over the action of the coal administration in placing the automobile arbitrarily as a non-essential. Without the activity in automotive business of the year to date, it is pointed out that many of the industries classed as essential would be operating at a low figure or not operating at all.

Lansing Output of Stars Contracted For by Dealers

Production to Start Sept. 15 and Expected to Soon Reach 400 a Day

DETROIT, Aug. 19—Contracts signed with distributors this week will take practically the entire output of Star cars by the Durant factory, Lansing, for the entire year of 1923, according to a statement issued by factory officials following a two days' session. The Lansing plant will manufacture Stars for the entire territory between the Alleghenies and the Rockies and its plant capacity is 400 cars daily.

A start on the manufacture of the Star will be made at the Lansing plant on Sept. 15, but it is not expected to get into capacity operation much before the first of the year. Two assembly tracks are now completed at the Lansing plant and there remains only the installation of minor machinery. Delays in material and parts shipments will hold back operations temporarily, officials said, but this situation will be overcome rapidly.

Carroll Downs, president and general manager of the Star corporations, addressed the meeting of dealers. No statement on the proposed method of distribution of the product was forthcoming from the meeting, it being said that Downes would make a statement on this within a short time. It is reported in Detroit that the plans involve the financing of the cars until sold by the dealer. Most of the middle western territory was reported represented at the meeting, though there remains some territory yet to be assigned. Among the distributors represented were Toter McGregor Co., Minneapolis; K. T. Wiedemann Co., St. Paul; H. A. White Auto Co., Memphis; Chidester-Frint Co., Milwaukee; Conant Automobile Co., Houston; Baker-McDowell Hardware Co., Oklahoma City; Inter-Mountain Motor Car Co., Salt Lake City; San Antonio Cadillac Co., San Antonio; S. B. Hicks Motor Co., Shreveport.

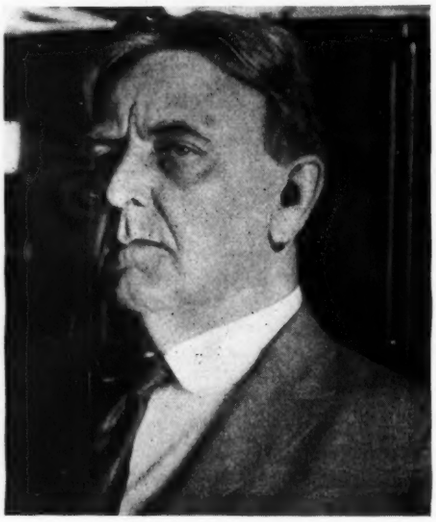
W. J. Cart, Hot Sulphur Springs, Col., Herchede Motor Car Co., Cincinnati; Peiter Automobile Co., Grand Rapids; Mosher Motor Sales Co.,Cleveland; Lostro Auto Sales Co., Columbus; D. A. O'Dell Motor Car Co., Duluth; Heison & Tyler, Webster City, Iowa; Bozer-Patten Automobile Co., Indianapolis; Hathaway Motor Co., Kansas City; Hawry Motor Co., Louisville; F. G. Stroop, Dayton; A. Murphy & Son, Omaha; Spalding Motor Co., St. Louis; S. Y. Brigham Motor Co., Toledo; A. G. Graben Motor Co., Des Moines; Hutchings Motor Co., Cedar Rapids.

NEW ATTERBURY TRUCK MODELS

BUFFALO, N. Y., Aug. 19—Two new truck models have been brought out by the Atterbury Motor Car Co. These are of 2½ and 3½ tons capacity, thus completing the company's line which heretofore consisted of 1½ and 5 ton models. Among the new specifications are the following: K4 and L4 Continental engines with pressure feed lubrication and removable cylinder heads; Delco lighting, semi-enclosed all steel cab with doors, built in glass windshield, amidship transmission with four speeds forward and one reverse, longer wheelbase, lower transmission gear ratios, combination radiator guards and bumpers and Alemite chassis lubrication system.

The new price list for the chassis follows: 1½ ton, $2,475; 2½ ton, standard wheelbase, $3,375, long wheelbase, $3,475; 3½ ton, standard wheelbase, $4,275, long or special short wheelbase, $4,375; 5 ton, standard wheelbase, $4,975, long wheelbase, $5,125.

Senates' Gasoline Inquiry Delayed for Tariff Vote



GILBERT C. ROE

WASHINGTON, Aug. 17—The Senate gasoline inquiry, which has been under way for more than two months has been temporarily halted, pending the passage of the tariff bill. Members of the Committee on Manufacturers, who are conducting the inquiry, state that the investigation, will be resumed as soon as possible.

An offer to testify was received yesterday from W. C. Teagle, president of the Standard Oil Co. of New Jersey by Senator McNary, acting chairman of the committee. Teagle's invitation will be accepted, according to Gilbert C. Roe, in charge of the investigation, who states that the Standard Oil's head, lead the list of those who would be subpoened. The only witness that has been heard to date is Secretary Welch of the Petroleum Institute.

RECEIVER FOR LIBERTY TIRE CORP.

AKRON, O., Aug. 21—Stockholders of the Liberty Tire Corp. of Carey, O., have applied to the federal court of Toledo to have the company adjudged bankrupt. The proceedings follow receivership action at Carey, in which A. H. Schwartz was named receiver a few days ago.

Hudson-Essex Sales Reported Increasing in 21 States

August Business Will Exceed That of July and Make This the Company's Best Month

DETROIT, Aug. 21—Sales of Hudson and Essex cars for the last six months of 1922 are expected to run from 20 to 25 per cent heavier than in the first six months. Reports received from dealers in all parts of the country indicate ready demand for cars, in some sections the dealers being considerably behind on deliveries. Enclosed car sales are reported increasing.

Shipments of Hudson-Essex for the first fifteen days of August were higher than for any similar number of days in the company's history. The demand for cars has resulted in the factory increasing its intensive schedules for the later months of the year three separate times. Orders now on hand assure capacity operation for several weeks. No let up in production due to the coal or rail strike is anticipated.

Total August business will show an increase over the July total, which was the largest the company has had. August, 1921, business will be exceeded by 200 per cent, and the largest previous August by 40 per cent. September business will set a new September record.

Increased business is reported from Portland, Ore.; Providence, Dallas, Shreveport, Miami, Tampa, and Lincoln, Neb. States in which business is reported larger now than at any time this year are Oklahoma, Tennessee, the Carolinas, Georgia, Florida, Mississippi, Louisiana, Texas, Utah, Oregon, Montana, Kansas, Nebraska, Ohio, Iowa, Illinois, Indiana, New York, Connecticut, Rhode Island and Massachusetts. Most other states are ordering in about the same volume as in May, June and July.

Rural business is reported to be good, but most of the buying continues to come from the larger cities.

CORDUROY TIRES REDUCED

GRAND RAPIDS, Mich., Aug. 21—Prices on Corduroy tires have been reduced by the Grand Rapids Tire & Rubber Corp, ranging from $2.05 on the popular 30x3 up to $5.45 on the 35x5. On the popular sizes these reductions have been: 30x3 clincher, from $17 to $14.95; 31x4, from $29.40 to $26.45; 33x4, from $34.25 to $30.85; 34x4½, from $43.90 to $39.50; 35x5, from $54.75 to $49.30.

FILMS SHOW ROAD BUILDING

WASHINGTON, Aug. 19—A series of one reel motion picture films, illustrating modern practice in the construction of the various types of highways, as being best adaptable to automotive use, has been prepared under the direction of the Bureau of Public Roads and are now available for free distribution upon application to the U. S. Department of Commerce.

Comparative Table of Automobile Shipments

NEW YORK, Aug. 19—With the figures only 90 per cent complete, reports to the National Automobile Chamber of Commerce indicate that July production of passenger cars and trucks approximated 246,600, which exceeded July, 1921, by 39 per cent and the best previous July which was in 1920, by 20 per cent. The decrease under June of 14 per cent is seasonal and expected. This is a record for production in July and is the third largest single month's production in the history of the industry, being exceeded only by the two preceding months. The following table shows the factory shipment figures for the first seven months of 1920, 1921 and 1922:

	Carloads			Driveaways			Boat		
	1920	1921	1922	1920	1921	1922	1920	1921	1922
January	20,057	6,485	15,357	29,283	3,185	7,479	.....	93	143
February	25,505	9,986	19,636	43,719	7,507	10,173	.....	99	180
March	29,236	16,287	27,753	57,273	9,939	16,917	.....	75	560
April	17,147	20,187	31,334	64,634	14,197	22,381	.....	1,619	2,960
May	21,977	18,608	33,416	74,286	15,193	28,827	.....	2,381	7,406
June	22,516	20,269	34,230	60,746	18,834	33,857	8,350	3,947	7,737
July	23,082	19,514	28,412	52,342	15,533	28,022	8,702	3,726	6,855

Factory shipments for the other months of 1920 and 1921 follow:

	Carloads		Driveaways		Boat	
	1920	1921	1920	1921	1920	1921
August	23,386	20,350	34,060	14,290	7,095	3,565
September	20,804	20,150	24,431	13,550	5,469	3,580
October	17,209	17,323	14,127	11,257	2,519	2,300
November	13,253	14,061	9,497	10,509	659	1,385
December	11,802	12,100	6,469	7,500	89	134

CLEVELAND WINTER SHOW

CLEVELAND, Aug. 18—The annual winter show of the Cleveland territory will be held in this city Jan. 20 to 27. Announcement of the date has been made by Herbert Buckman, secretary of the Cleveland Automobile Manufacturers' & Dealers' Assn., which will have charge of the exhibit.

For the last two years efforts had been made to conduct the annual showing of automobiles in the new $8,000,000 municipal auditorium, but without avail. The next show will be held in this structure and the available space will enable the management to enlarge on its plans of last year.

SOUTHERN BUICK DEALERS MEET

ATLANTA, Ga., Aug. 19—The keynote of the annual convention of southeastern Buick dealers held in Atlanta this month was optimism over the outlook for the future, every dealer expressing the opinion that business the past four or five months has been very close to the pre-war normal, and that the future outlook portends a steady sales demand for the coming year. About 150 dealers attended from five southeastern states, and mapped out their sales and advertising program for the next few months.

NEW LEXINGTON LINE

CONNERSVILLE, Ind., Aug. 18—The Lexington line for 1923, just announced by the Lexington Motor Co., shows ten body types included in the list of Series 23 models. The company has decided to confine its line to one chassis, the Ultimate, with 123 in. wheelbase, abandoning for 1923 the 122 in. and the 128. The Ansted will be the only engine used in the new line.

Of the 1922 family only two models are retained, the 5 passenger phaeton, which has been reduced from $1745 to $1695, and the 5 passenger sport model, which has been dropped from $2100 to $2045.

The rest of the new line consists of a 2 passenger roadster, which lists at $1695; a 7 passenger phaeton, at $1795; 5 passenger California top, $1995; 7 passenger California top, $2095; 5 passenger royal coach, $2145; 4 passenger coupe, $2345; 5 passenger sedan, $2545; 4 passenger brougham, $2645. The roadster, royal coach and brougham are brand new additions to the line.

NEW STANDARD BUS

DETROIT, Aug. 22—The Standard Motor Truck Co. has brought out a new 10-passenger bus, the general body construction of which is similar to that of the British Char-a-bancs. The regular Standard Model 75 truck chassis will be used for this bus job. The price is $2,500.

ZUMSTEIN HANDLES MASTER SALES

CHICAGO, Aug. 19 — The Master Trucks, Inc., denies published reports that T. B. W. Zumstein has succeeded W. E. Cobb as manager of the New York branch of the Master Trucks. Cobb recently resigned and Zumstein, who is in charge of all sales activities of the Master Trucks, temporarily took charge of the New York branch, giving rise to reports that he had been appointed manager of that branch. The company states that Zumstein still remains in charge of all sales activities and that a successor to Cobb has not yet been appointed.

PIERCE-ARROW TO EXPAND

BUFFALO, Aug. 19—Official statements made by the Pierce-Arrow Motor Car Co. indicate that factory production will be placed and continued on a full time basis. M. E. Forbes, vice-president and general manager of the company, said it's price reductions have resulted in an influx of orders which indicate production can be maintained at a rate which will result in the output for the first half of 1922 being doubled during the last six months of the year.

8,494 Is Total Registration for July in New York District

NEW YORK, Aug. 18—Registration figures as compiled by Sherlock & Arnold, publisher of the Automobile Sales Analysis, for the ten counties in and around New York City for July show a total of 8,494 as compared with 9,068 in June and 9, 431 in May. For the first seven months this year registration aggregated 48,073 as against 30,422 for the corresponding period last year.

In the medium and low priced class four cars lead the field with three others some distance behind but considerably ahead of those following them. Nine cars are well in the lead in the higher priced cars.

A summary of registrations for the first seven months in the high, medium and low priced classes is as follows:

	High Price	Medium and Low Price
January	283	2,017
February	273	2,231
March	632	6,354
April	862	8,428
May	961	8,470
June	865	8,203
July	678	7,816
Total	4,554	43,519
Total (1921)	2,879	27,543

AUBURN PRICE REDUCTIONS

AUBURN, Ind., Aug. 18—Price reductions announced today by the Auburn Automobile Co. are shown in the following list:

	Old price	New price
5-pass. phaeton	$1575	$1475
7-pass. phaeton	1615	1545
Sedan	2395	2345
Sport	2195	1995

NOMA PRICES INCREASED

NEW YORK, Aug. 17—Noma Motors of New York announces a decided increase in prices, ranging from $300 to $500, affecting the whole line of C models. The prices are as follows:

	Old Price	New Price
2-pass. speedster	$2,000	$2,500
Foursome	2,100	2,500
6-pass. phaeton	2,200	2,600
5 pass. sedan	3,200	3,500

FORD RECORD IN JULY

DETROIT, Aug. 21—Ford production figures show that July output approximated 152,000, which surpasses June in which month a new Ford record was made in retail sales of cars, trucks and tractors. Sales for June totaled 148,439 vehicles, an average of 5,709 daily. Of this total 132,950 were sold in the United States, 6,054 in Canada and 9,435 in Europe.

STRIKE AFFECTS DELIVERIES

BIRMINGHAM, Ala., Aug. 17—The railroad strike has the automobile dealers of Birmingham marking time so far as deliveries are concerned, but this is not preventing them from going after the business with the hope that they will soon be able to make deliveries.

Speed Trap Operators Ordered to Refund $1,500 to Motorists

Dayton Automobile Club Wins Important Victory in Behalf of Car Owners

DAYTON, O., Aug. 21—Illegal speed traps operated by justices of the peace and their special constables, appointed for the purpose of collecting fines from motorists for revenue, are fast disapearing in many sections of Ohio. One of the most notable of such cases to come to a sudden end recently was that conducted by George C. French, Justice of the Peace and his constable, O. R. Reed, in Wayne township, Montgomery County.

Suspension of such operations on the part of those two officials was brought about through the efforts of the Dayton Automobile Club, led by its manager Paul Ackerman, resulting in an order being handed down by Common Pleas Judge Patterson of Montgomery county directing French and Reed to return $1,500 to members of the club in Dayton which had been illegally collected from them in fines and costs.

The termination of this speed trap is viewed not only as a signal victory for the Dayton Club but for automobile owners generally of the state and particularly for organized motorists in Ohio as represented by the Ohio State Automobile Association and its 60 or more affiliated clubs.

The State association has persistently been fighting speed traps of the character of that which was operated in Montgomery county, and has been successful in breaking them up wherever the organization has gone after them through legal channels. Some of the places where illegal operations of this kind have been stopped were in Marion, Franklin, Madison, Fairfield, and other counties.

JUNE BIG TIRE MONTH

AKRON, O., Aug. 18—As a striking index of improving business conditions the Goodyear Tire & Rubber Co. in its semi-annual statement issued this week reports a larger number of automobile tires sold in June than in any month in the history of the company.

Citing the fact that production and sales for the half year ending June 30, 1922, had materially exceeded those of the same period last year, President E. G. Wilmer's report adds, "Goodyear sold and delivered 779,590 automobile tires in the month of June, 1922. This is a new high record in Goodyear history and exceeds the previous monthly peak record of 734,948 in the month of March, 1920."

JULY MOON'S BEST MONTH

ST. LOUIS, Aug. 17.—The Moon Motor Car Company announces that its sales for the first seven months of this year exceed sales for the entire year of 1921 and also for the year of 1920. Sales for July were 29 per cent greater than the sales for June which was the previous high month.

Slowing up of the demand in a few sections of the country is noted, but the company states that unfilled orders on hand Aug. 1 were sufficient to keep the factory running at capacity until October. Twenty-five car loads of automobiles were shipped by express to New York by the Moon company last month. The present output is 50 cars a day.

SHERMAN SPEAKS AT CLEVELAND

CHICAGO, Aug. 17—Ray W. Sherman, merchandising director of the Automotive Equipment Assn., made a talk last week to members of the Cleveland Automobile Manufacturers and Dealers' Assn., and the same day he spoke at a convention of the National Lamp Works salesmen, executives and jobber guests, where he exhibited the "Shop Profits" moving picture.

OHIO RUBBER CO. SOLD

SANDUSKY, O., Aug. 21—The Clinton Tire & Rubber Co. has bought at a receiver's sale the Ohio State Rubber Tire Co., which is located here. The property was appraised at $262,000 and the indebtedness was about $300,000. The sale price was $150,000. The purchasing company has been incorporated for $100,000 and will have the local plant in operation next month.

New Westcott Shipments Are of Good Size

SPRINGFIELD, O., Aug. 18.—Good sized shipments of the new seven passenger Westcott car are being made from the plant of the Westcott Motor Car Co., according to announcement of the officers. The touring car is meeting with general favor, it is stated. Only a few cars have been built so far. These have been sent to Cincinnati, Cleveland, Chicago and Oklahoma City. A new five passenger series was brought out in the spring by the company.

As a result of the performance of the speed truck which is made at the Springfield plant of the International Harvester Co., more than 3,000 carloads of these trucks have been shipped to purchasers during the last ten months, according to a statement issued at the local works.

The Kelly-Springfield Motor Truck Company is enjoying a ready sale of its new model truck known as Model 6. Gradually, the large plant is speeding up and increasing its force.

OHIO TRADES CONVENTION DATES

TOLEDO, Aug. 19—Plans are now being formulated for the entertainment of the Ohio Automotive Trades Association at its annual convention to be held here Dec. 6. 7 and 8. T. J. Cooper, secretary of the Toledo Automotive Trades Association, expects a large attendance of Ohio dealers at the state meeting.

State Men Make Brake Inspections on Road

Massachusetts to Pass Law for Compulsory Brake Inspection

BOSTON, Aug. 19—Motorists in Massachusetts, and that includes residents of other states operating in the Bay State, who thought that the only function of the state constabulary and the highway commission inspector was to keep an eye on speed and headlights, were enlightened that there are other laws to be observed when more than 200 of them were stopped last night on the highway near Newburyport.

"How are your brakes?" they were asked individually.

And the officials did not accept the word of each motorist. They had a section arranged where it was possible for drivers to manipulate the cars. In a number of cases the inspectors got into the cars and tried the brakes. In a number of instances they found the brakes slipped either a little or a great deal. They took the names of the drivers and owners of the cars, and notified them that on going home not to operate again on the highways until their brakes were put in proper working condition. And to see that the edict will be carried out, the drivers were ordered to report within a few days at various places to give actual proof that it has been done, or their licenses and car registrations will be revoked.

"There have been a number of accidents lately which might have been averted if the brakes held," said Motor Vehicle Registrar Frank A. Goodwin. "Faulty brakes is no alibi with me. But as my job is to try to minimize accidents, I believe in making owners take care of themselves and their passengers, also other safe users of the highways, if they do not know enough to do this on their own account. These inspections will be held all over the state, unexpectedly, from now on."

Next year Godwin will ask for a law making it compulsory to have brakes inspected every so often at recognized, reliable places.

NEW A. E. A. PUBLICATION

CHICAGO, Aug. 21—Publication of the "Sales Executive," a paper for sales executives of members of the Automotive Equipment Association, has been commenced by the merchandising department of the association, of which Ray W. Sherman is director. The initial announcement states that the paper will be published once or twice a month, depending upon the response with which it is met by the men for whom it is intended. Its chief purpose is to distribute to all the sales executives the good ideas which others have tried and found successful.

IN THE RETAIL FIELD

R. T. C. Motor Co. recently incorporated at Marshalltown, Ia., with $25,000 capital, will be direct district factory agency for the Studebaker lines and has leased the Cummings building, 113-115 East State street. The building is being remodeled for sales and showrooms and the agency will open about Sept. 1. Territory includes Marshall and Hardin counties, parts of Story, Tama and Franklin counties. W. R. Thomas, Norwalk banker, is president of the R. T. C. company, but the agency will be under personal direction of John F. Risewick, formerly sales manager for Sheriff-Blair Motor Company, Des Moines.

George Cummings has organized the Cummings Motor Co. at Peoria, Ill., and has opened a plant at 1616 Main street. He will distribute the Ford car in Peoria county, the second company to be given this privilege. Cummings was formerly distributor of the Lincoln car in Peoria and, when the Lincoln interests were purchased by Ford, he joined the Mackemer Motor Company which has long had the exclusive distribution of the Ford car in Peoria.

Carleton Brothers, 417 West Third street, Davenport, Iowa, have taken over the Jewett and Paige agencies, formerly handled by the Mohl Motor Truck Co., 230 West Front street. The company will operate its own maintenance station for the cars it handles, Carleton Brothers announce.

The new Kilroy-Nash Motor Co., recently organized in Savannah to act as Nash distributors in that territory, has established service station and sales rooms at 406 East Oglethorpe avenue. W. L. Kilroy, of Savannah, heads the business.

Zell Motor Car Co. has been formed in Baltimore to act as Packard distributor for the greater part of Maryland. The company succeeds Packard Motor Car Co. of Baltimore which has acted as Packard distributor in that territory since 1905. George Miller, head of the old company, is retiring from business which is the principal reason for the change. A. Stanley Zell is president of the company.

Davis and Culver Motor Co., Galesburg, Ill., has materially increased floor space in its new location, 131 North Cherry street. The showroom is on the first floor, the repair department on the second and two upper floors are available for storage.

Irey & Allsup, Monmouth, Ill., have been appointed local territory agents for the Hupmobile.

Lostro Auto Sales Co., distributor for the Durant, at Columbus, Ohio, has leased a salesroom and maintenance station at 327 East Broad street.

Neel-Cadillac Co., Philadelphia, has appointed the F. W. Peters Motor Car Co., Bordentown, N. J., and Burlington, N. J., and Branson & Doerr, with territory including Vineland and Millville, as Cadillac dealers.

Commercial Truck Co., Philadelphia, has sold to the Wagner Pastry Co., Brooklyn, N. Y., a fleet of 177 two-ton electric trucks.

Cruse-Crawford, of Birmingham, Ala., have made arrangements to open up a branch of their sales business in Bessemer. They will carry a stock of Willys-Knights, Overlands and Hupmobiles and will render service for them.

Jaeger-Dowling Co., Neenah, Wis., has been incorporated with a capital stock of $50,000 to do a wholesale and retail business in passenger cars, motor trucks, tractors, agricultural operating equipment, etc. The principals are P. R. Jaeger, W. J. Dowling and C. C. Del Marcelle.

Wisconsin Independent Auto Co., Milwaukee, has been granted a charter to deal in new and used motor vehicles, operate a garage and maintenance station, etc. The capital stock is $10,000 and the incorporators are John Schulz and Charles Rietz, 736 Hubbard street.

Marathon Motor Car Co., 210 McClellan street, Wausau, Wis., Ford dealer, will build a $60,000 addition to its sales and maintenance building. It will be 60x120 ft., four stories.

Roy Hermann, Black Earth, Wis., will build a new garage and service building estimated to cost $20,000.

Ehrlich & Kindel Vulcanizing Co., Sheboygan, Wis., has been organized by A. H. Ehrlich and R. W. Kindel, tire merchandisers and repairers. A store and shop has been opened at 1113 North Eighth street.

Merrill Buick Co., Merrill, Wis., has occupied its new fireproof sales and service building, erected and equipped at a cost of more than $30,000.

W. A. Knaak Motor Co., Sheboygan, Wis., is investing $25,000 in improving its garage and service station and erecting a large addition.

Corcoran & Meadows have established a store at Columbus, Ga., for the handling of automobile equipment. The members of the firm are E. M. Corcoran and J. T. Meadows. They expect to handle a complete line of automobile equipment.

A. S. Johnston of Atlanta will open a local agency at Columbus, Ga., for the sale of Willard batteries. The firm will be known as the Johnston Battery Co. They will have a modern "drive-in" station at the corner of 11th street and 1st avenue.

Stephen Haas, Philadelphia, has taken over for eastern Pennsylvania, New Jersey and Delaware the distribution of Ames bodies for Ford cars, built by the F. A. Ames Co., Inc., of Owensboro, Ky.

Wills Sainte Claire Co., of Pennsylvania, has completed negotiations for two large buildings, one for sales and the other for service, to be erected at a combined cost of over $500,000. The salesroom and general offices will be at 207-209 North Broad street, Philadelphia, and the present building on that site soon will be torn down to start rebuilding. The new structure here will contain six stories and a basement. W. J. Foss is president of the company and associated with him as vice-president is A. F. C. Keleher, of Pittsburgh.

Knudson Sales Co., Racine, Wis., has been incorporated with $15,000 capital to deal in motor vehicles, automotive equipment, etc. The incorporators are A. C. Knudson, Harry J. Stilb and Henry Ranuke.

Grand Avenue Buick Co., of Milwaukee, is a new corporation with $50,000 capital, organized by John P. Meehan, G. P. Allen and others. It has been granted a retail dealer franchise, making six Buick dealers in Milwaukee county, including the South Side Buick Co., also a new organization with Stanley P. Jack and John A. Piszczek as owners. The Grand Avenue company has opened temporary salesrooms and service headquarters at 266 Twenty-sixth street, and the South Side company at 597 Lincoln avenue.

Edwards Motor Car Co., Milwaukee distributor of the Dodge, has broken ground for a $100,000 headquarters building on Grand avenue, at Thirty-sixth street, to be ready about Dec. 1. Frank J. Edwards is president and general manager.

A. Maisano Auto Co., Madison, Wis., has started work on a new garage and service building, 60x110 ft., at 821-823 Regent street. It will cost about $20,000 completely equipped.

John F. Horstmeier, Madison, Wis., has opened a general automotive maintenance station at 1956 Railroad street. He formerly was department manager at the Harley-Davidson Motor Co., Milwaukee, and later a member of the Kentzler-Horstmeier Auto Co., Madison.

Oscar A. Huelsman, Fond du Lac, Wis., Dodge dealer, has acquired the former Lewis Garage at 19-21 Fourth street, as maintenance station, continuing to maintain showrooms and offices at 22 Forest avenue.

Kaerwer Auto Co., Oshkosh, Wis., has let contracts for the erection of a 1-story brick and concrete addition, 60x130 ft., for service and storage.

Jerome Terwilliger, Ford dealer at Clinton, Wis., will build a branch sales and service station, two stories, 75x135 ft., costing $50,000, in Beloit, Wis. at 510-514 Broad street.

Valley Inn Buick Co., Neenah, Wis., has been organized by L. H. Bleecker, formerly Ford dealer, to handle the Buick line in Neenah-Menasha and vicinity. Carl Achtenhagen is associated with Bleecker.

C. H. Halperin & Co., 207-209 Park street, Madison, Wis., jobber and dealer in automotive equipment, has been appointed district distributor of the Odell line of cord tires and the South Bend fabric tires.

Sheboygan (Wis.) Auto Parts Co. has been organized by George Regh of Milwaukee and on Sept. 1 will open for business at 715 North Eighth Street as a jobber of and dealer in general automotive equipment.

Milwaukee Automobile Service Co., Milwaukee, Wis., Velie dealer, has changed its corporate title to the Velie Sales Corp. of Milwaukee. E. B. Deffer is secretary.

Merry Sales & Service Station, 6518 Greenfield avenue, West Allis, suburb of Milwaukee, has been appointed a new Mitchell dealer.

Fox River Motor Co., Green Bay, Wis., has been incorporated with $100,000 capital stock by Charles W. Collins, E. M. Stenger and Lynn D. Joseph.

Automotive Vehicles to Make Up Large Part of Peoria Show

Sept. 4 is Date Set for National Implement and Vehicle Show in Illinois

PEORIA, Ill., Aug. 19—The annual display of the National Implement and Vehicle show at Peoria, will be marked by a very large showing of automobiles, trucks, and tractors. The date has been fixed for the second week of September. The Peoria Automobile Dealers and Accessories Assn., has been allotted 29,000 square feet of space in machinery hall for the display of cars and accessories and a meeting was held on Aug. 7 to draw for space. Since the destruction of the Peoria Coliseum by fire, the dealers at Peoria have been unable to find a suitable building for their annual show and the only opportunity lies in a display in connection with the vehicle and implement show. This is an annual event and ranks with the state fair in importance and attendance. A program of horse races, aeroplane stunts, and other attractions, attracts between 50,000 and 100,000 people annually. These come largely from the rural districts. The manufacturers of power farming implements and agricultural machinery, are sponsors of the show, and support it liberally. Each year has witnessed an increase in attendance and interest. Owing to the fact that central Illinois farmers are enjoying prosperity once more after several lean years, and, it is expected, they will commence buying motor cars, trucks and tractors again, due to their bumper crops and the higher prices for grain and live stock, the automobile dealers of Peoria and vicinity, propose to utilize the coming show to stimulate fall business among the agricultural patrons and a vigorous sales campaign will be waged during the fall and winter months. The corn crop is now out of danger and all that is needed is dry and warm weather to mature the grain during the remainder of August and September. Everything points to the largest yield in many years and with large returns from oats, hay, wheat and live stock, the central Illinois farmers are once more on easy street.

SPOKANE SHOW SEPT. 4 TO 9

SPOKANE, Wash. Aug. 18—This city's annual automobile show will be held Sept. 4-9 in connection with and as a feature of the Interstate fair. A handsome structure is turned over to the show and all the space available has been allotted. More than 15,000 square feet of space will be used by local automobile dealers to display cars. All dealers planning to exhibit have placed orders with factories for late models. To provide sufficient space for all automobile exhibits it will be necessary to erect a tent outside of the automobile building.

BUSINESS NOTES

Official notice is being published to stockholders, creditors and bondholders of the Gillette Rubber Co., Eau Claire, Wis., that a joint meeting will be held at the general offices at the plant on Sept. 1, at 2 p. m., for the purpose of considering the matter of the appointment of a committee or committees for the protection of the interests of creditors or stockholders. The notice is signed by R. W. Hutchens, secretary.

C. A. Shaler Co., Waupun, Wis., manufacturer of vulcanizing apparatus, headlight lenses and other specialized lines of garage and repairmen's and owners' equipment, has completed its new plant, erected to replace the works destroyed by fire early in the year.

Super-Traction Truck & Motor Car Co. has been incorporated with $50,000 capital stock at Shiocton, Wis., by W. E. Gosch, Rudolph Schwandt and John D. Kreen. It is the intention to develop and market a new design of chassis, details of which, however, have been withheld for the present.

Simplicity Engine & Mfg. Co., Milwaukee, maker of special garage tools and machinery, has recently increased its capital stock to $50,000 to finance the development and growth of its business.

S. C. Johnson & Sons Co., Racine, Wis., manufacturer of wax finishes, varnishes, paints, etc., for motor cars, furniture, etc., let contracts during the week for a three-story fireproof addition, 60x162 ft., costing about $150,000, including all equipment.

Stover Signal Engineering Co., which recently moved its plant and offices from Cleveland, O., to Racine, Wis., is now in quantity production of a line of three models of automatic signals for motor vehicles designed according to the latest ideas having reference to standardization of types and colors.

Following the recent filing of a voluntary petition, the Oliver Rim Co., manufacturers of automobile rims, has been declared in bankruptcy by the Federal courts at Atlanta, Ga., and W. A. Fuller, of Atlanta, has been named receiver. An involuntary petition against the company filed by several creditors has been denied.

Guarantee Battery Co. and Earl P. Cooper, Inc., both of San Francisco, have merged and formed a new corporation known as Earl Cooper-Guarantee Battery Co. The officers are: President, Earl P. Cooper; vice-president and treasurer, Fred J. Brand; second vice-president, George E. Cushman; secretary, Austin D. Rouse.

The state of Illinois has let contracts for 750,000 pairs of motor car license plates for 1923. The new color scheme will be olive green with white numerals.

An involuntary petition in bankruptcy has been filed in the district court in Atlanta by several creditors, against Blanchard, Inc., wholesale automotive accessory dealers of Atlanta.

Moon Co., of Georgia, has been organized and incorporated to handle the distribution of Moon cars in Georgia. Salesrooms and maintenance station are at 251 Ivy street, Atlanta. Larry Grant is president of the new company.

Scholder Tire & Accessory Co., Birmingham, Ala., has found it necessary to extend their quarters, and have rented, in addition to the two buildings they now occupy, 122 South Twenty-first street.

Starkweather-Snook Co., Moline, Ill., manufacturers of shock absorbers for motor vehicles, has increased the capitalization from $70,000 to $150,000 and will erect a new building at 246 First street, that city, at an expense of $50,000. Ground has been broken and the new plant will be ready for occupancy by the first of January, 1923. It will be of two stories, 100x150 ft.

Southern Tire & Rubber Co., of Augusta, Ga., manufacturers of fabric and cord tires, announced a new tire this month, a 30x3½-inch, five-ply, to sell for $8.50.

American Automobile Cleaners with $25,000 capital stock has been incorporated with headquarters in Davenport, Ia., to maintain branches throughout Iowa, Illinois and Wisconsin. The company is organized to give owners an exclusive service in washing, cleaning, inspecting and greasing cars. The firm does not engage in any repair work. Each plant will have a local manager experienced in this particular line.

Purchasers of the Ohio State Rubber Tire Co., Port Clinton, O., which was sold reecntly at receiver's sale for $150,000, have changed the name of the concern to the Wildman Tire & Rubber Co. The new company will be incorporated for $250,000, of which $200,000 will be common stock, no par, and $50,000 preferred. Directors are named as follows: W. W. Wildman, Bay City, Mich.; F. J. Reichert, Port Clinton; W. A. Twynham, Akron; H. B. Orr, Bay City; F. J. Langenau, Cleveland.

Hewitt Rubber Co., Buffalo, N. Y., announces reduced prices on its entire line of tires and tubes. The 30x3½ now sells for $10.65 in the fabric and $14.95 in the White Seal cord.

Motor & Accessories Manufacturers Assn. will move its New York headquarters on Oct. 1, having leased office room on the twentieth floor of the new Fisk building, Broadway and 57th street. The association will have 50 per cent more space than it at present occupies in Aeolian Hall, 3 West 42nd street, where it has been located for the past 10 years. In making the move, General Manager M. L. Heminway was influenced to a certain extent by the fact that the rubber association and other organizations with which the M. A. M. A. is in close contact are in the Fisk building also.

Lancaster Tire & Rubber Co., Columbus, Ohio, reports that sales to date show an increase of approximately 100 per cent over the same period a year ago. The factories are operating double shift.

India Tire & Rubber Co., Akron, reports that the net volume of business for the last seven months totaled $1,088,000, an increase of 46½ per cent in dollars and 80 per cent in units over the figures for the same period last year. Net earnings amounted to $214,419.37, or 30 per cent on the total outstanding preferred and common stock for that period of six months. At the present time the company is turning out 600 casings and 800 tubes daily.

General Motors Truck Co., Pontiac, Mich., manufacturers of the GMC truck, has opened a branch at 1809 West Broadway, Louisville, Ky., to serve that territory. E. W. Boyes has been appointed branch manager. A large stock of parts as well as trucks will be carried at the branch at all times.

Lincoln Auto Electric Co., of Lincoln, Neb., has passed into the hands of F. T. Nelson and Ben M. Lampert. Nelson will have general charge of the business and the office work and Lampert of the shop.

Everybody's Auto Accessory Co., Columbus, Ohio, has been chartered with a capital of $10,000 to operate an accessory and parts store at 118 East Long street, Columbus, O. Incorporators are Lewis M. Smith, John W. Rile, George F. Smith, M. C. Rile and E. G. Smith.

Moline Auto Devices Co. has been incorporated with $10,000 capital stock to manufacture and deal in accessories. Its location is 403 Fifteenth street, Moline, Ill. George Hager, Ezra H. Sohner, David D. Kennedy, Martin S. Dondanville, Ernest Jericho and H. W. Battles, Jr., all of Moline, and Charles W. Peterson, Davenport, are incorporators.

Ray L. Howard, long associated with Horst & Streiter, has occupied the newly erected Lacy building, 412 West Third street, Davenport, Ia., and will conduct a garage business there.

Phil Miler has purchased the business of Hay Brothers, Kewanee, Ill., tire and accessory dealers, and will conduct the business as a wholesale and retail store.

Scholzen Spring Cushion Co. of Milwaukee has been incorporated with $25,000 capital to take over a business of similar name organized recently by Nat Scholzen to manufacture springs for motor car and furniture cushions and upholstering. The plant and offices are located at 502 Cherry Street.

Jerome H. Chopiska, J. V. Nigro and Frank Chopiska, formerly with the Chopa Piston Ring Co., Auburn, Ind., have established a new industry in LaCrosse, Wis., under the name of LaCrosse Motors Equipment Co. at 227 North Third street. It is specializing in the manufacture of a new design of piston ring, known as the LaCrosse Triple Seal. Through the operation of a powerful spring and a patented triple seal device the ring is automatically maintained a tight fit to prevent leakage of oil into the combustion chamber.

Crawford Automobile Co., Hagerstown, Md., makers of a new custom-built car, have announced that they are now making plans for nation-wide distribution of their product. The price of the first model will be $3,500 f. o. b. Hagerstown.

Articles of incorporation have been filed in behalf of the Tractor & Truck Improvement Co., of Merrill, Wis. It is organized with a capital stock of $25,000 to manufacture and deal in mechanical devices representing improvements in the design and equipment of tractors, motor trucks and power farm operating equipment, but exact details are withheld. The principals are R. E. Kile, J. G. Frogner and Dan Healy, all of Merrill.

Fraud is Charge Against Dragon Motors Co., Chicago

Officers of Two Firms Indicted for Misuse of Mails and Swindling

CHICAGO, Aug. 18 — Indictments against officials of two firms for alleged fraud within the automotive industry have been voted by a United States grand jury here and made public by Assistant United States District Attorney Barry F. Hamlin. The firms are:

Dragon Motors, capitalized at $1,000,000; officers indicted, Herman Neidick, Joseph Stein and Hyman Edelman.

Caterpillar Mfg. Co., Ltd.; officers indicted, Charles Weidman, W. C. C. Weidman, John A. Seibert, E. J. Anderson and M. E. Poehly.

In both cases misuse of the mails in the sale of stock or "territorial rights" is alleged. It is charged that stock of the Dragon Motors was sold through the mails by the Neidick Financial Corp. on alleged fraudulent claims that the company was manufacturing one automobile a day, that it possessed assets of $592,772 and that orders were on file for $600,000 worth of taxicabs. It is charged that about 300 persons were swindled out of sums ranging from $100 to $5,000 through investment in the Dragon Motors. The photograph of an old moving picture studio in Chicago is said to have been circulated as that of the "home of Dragon Motors."

The Caterpillar Mfg. Co. is charged with having sold through the mails territorial rights for a "marvelous tire rejuvenation invention." Advertising claimed that the company was the possessor of a secret process for making new tires out of old casings. It is alleged that territorial rights were sold at from $100 to $1,000 and that investors were told they could restore old casings and sell them for a guaranteed service of 5,000 miles at $5 each.

PENNSYLVANIA TO TRY MOTORS

PHILADELPHIA, Aug. 19—The Pennsylvania Railroad has announced that it is in the market for about 20 gasoline-driven cars that can be used on its branch lines, especially those on which the traffic is comparatively light. Recent demonstrations of gasoline power cars of the bus type were regarded as satisfactory, but the motive power department desires something different—a car with power enough to draw a trailer when necessary. The company, it is said, plans to install a gasoline car on its Bustleton branch. A shuttle train now is running between Holmesburg Junction on the New York division, and Bustleton. Two cars are needed for this work The Cresheim branch is another where gasoline power cars could be used to advantage.

CONCERNING MEN YOU KNOW

David L. Gallup, for years consulting engineer of the Nordyke & Marmon Co., has severed his connection with the Indianapolis concern. Gallup has decided to open his own office in Indianapolis, specializing on investigation advice and reports pertaining to design, materials, manufacture, tests and performance which his long connection with the automotive industry has fitted him.

Harry Huntoon, two years in the engineering department of Deere & Co., Moline, Ill., has been appointed plant engineer at the International Harvester Co tractor plant in Chicago. He will be associated with R. H. Keith, former works manager for the Universal Tractor.

Roy D. Chapin, president of Hudson Motor Car Co., with Mrs. Chapin, sailed for France this week on a short vacation trip.

Glenn A. Tisdale, who for ten years has been Franklin dealer in New York and Brooklyn, operating under the name of the Franklin Motor Car Co. of New York, is giving up his contract and expects to retire from business October 1. Tisdale came into the Franklin agency from outside the automobile business and has never distributed any other car. His present intention is to retire permanently from business. Tisdale's son, Glenn A. Tisdale, has just taken the Hupmobile dealership of Newark, under the name of G. W. Tisdale, Inc.

George J. Mead, who resigned Oct. 1 as chief plant layout engineer of the Federal Rubber Co., Cudahy, Milwaukee county, Wis., has been recalled to take charge of an extensive plant enlargement program which the Federal company is putting under way, and which will cover a period of several years.

F. P. Nusslock has been appointed general salesmanager of the Nelson-Mitchell Co., 525 Jefferson street, Milwaukee, distributor of the New Mitchell in Wisconsin, and retail dealer in Milwaukee. Nusslock in 1912, 1916 and again in 1918 was associated with the distribution of the Mitchell in this territory. For several years he was on duty at the factory in Racine, Wis.

Leo N. Burnett has resigned as advertising manager of the LaFayette Motors Corp. of Indianapolis, and will join the copy and planning department of the Homer McKee Co., Inc., advertising agents, Indianapolis, early in September. Burnett has directed LaFayette advertising since the inception of the company three years ago and was previously advertising manager of the Cadillac Motor Car Co., Detroit.

F. E. Richardson, who has been associated with some of the best known automobile distributing companies in Cleveland, has been elected president and general manager of the Avenue Motor Co., the Chalmers and Maxwell distributor in this territory.

LeRoy Hodge has been placed in charge of the technical service division of the service department of the Franklin Automobile Co., succeeding W. C. Small, now service manager for C. G. Heck, Franklin dealer at Philadelphia, Pa.

P. F. Hackethal has been appointed chief engineer for the Fox Motor Car Co. of Philadelphia. He was previously acting in the capacity of consulting engineer for the above company.

Frank B. Jacobs, cashier of the Willys-Overland Co., Toledo, died at Mercy Hospital Aug. 7 following an operation for appendicitis.

Gilbert U. Radoye has been appointed director of sales and advertising for the Haynes Automobile Co., Kokomo, Ind., according to an official announcement by Alton G. Seiberling, vice-president and general manager of the Haynes company.

Charles F. Remington has been appointed director of advertising and publicity for the Detroit Air Cooled Car Co., it is announced by William J. Doughty, president of the company.

Wm. F. Troescher, former general maanger of the Ohio Valley Motors Co., Cincinnati, O., has been made representative of the Premier Motor Corp. station at Cincinnati, to represent the interests of the Premier factory and Premier owners of Cincinnati and territory. The new company is styled Premier Motor Sales Co. running as a factory branch.

A. M. Russell, formerly of the Packard and Locomobile, has organized the Russell Co. of Kenosha, Wis., to manufacture automotive railway equipment. The new concern has made a contract with the Winther Motors Co., Kenosha, for production. The Russell gas-motor coach is now undergoing exhaustive experiments under practical working conditions on a number of leading steam railway systems.

Albert E. Becker, president of the Albert E. Becker Co., Milwaukee, distributor of Oldfield tires and general tire service and repair equipment, died Aug. 14, aged 37 years. He was for many years assistant sales manager of the Harley-Davidson Motor Co., before entering the tire jobbing business in 1918.

Clark Osterheld, assistant general superintendent of the Stoughton (Wis.) Wagon Co., in charge of the motor truck department, resigned Aug. 15 to become president of the Stoughton Mfg. Corp., recently organized to manufacture electric water heaters and other electrical devices designed and patented by him.

SHOW AIDS ALABAMA SALES

HUNTSVILLE, Ala., Aug. 18—Sales of automobiles have picked up in the Tennessee Valley towns. This applies to Huntsville in particular. The recent automobile show held here having a good effect on sales.

NEW BUICK DELIVERY LINE

FLINT, Mich., Aug. 18—The 1923 Buick line of special delivery cars will consist of six body types on the chassis used for the four cylinder Buick models. Mechanical changes have been made.

Crowned fenders have been added to either with drum type headlights, a redesigned radiator, which sets much higher, rubber bumpers on the rear axle, special anti-rattle hood catches, silent over-running generator clutch and a new glass switch face. A transmission speedometer drive, a lengthened gear shift and a transmission lock have also been included in the new models.

Felts have been placed around the valve stems to carry oil to the stems and guides and a new system of generator brushes and brush arms has been used to prevent squeaks. The clutch has been refined and the clutch hub changed from malleable iron to forged steel. The size of the strut and truss rods has been increased. Bands have been improved.

The new prices range from $840 to $935, varying with the type of body and equiqment.

TRACTOR COMPANY ACQUIRES SITE

CLEVELAND, Aug. 18—The Cleveland Tractor Co. was party to one of the largest real estate deals of the month of August, when it took the title from the Cleveland Trust Co. to the 38 acre tract which it occupies on Euclid avenue. The property has a frontage of 460 feet on Euclid avenue. At the same time the tractor company gave to the bank, as trustee, a mortgage deed of trust for $2,000,000, securing an issue of $700,000 prior lien 6 per cent mortgage bonds and $1,300,000 subsequent lien 6 per cent bonds dated July 15, 1922 and maturing in two years. The bank took title to this tract several years ago for Rolin H. White when he first began experimenting with the caterpillar tractor.

PATRIOT PRICE REDUCTION

HAVELOCK, Neb., Aug. 18—The Patriot Mfg. Co. has reduced the price of its Revere model, one-ton truck from $1380 to $1295 for the chassis.

National Used Car Conference to Have Three-Fold Purpose

Merchandising to Be Chief Discussion With Emphasis on Winter Selling

NEW YORK, Aug. 21—The national used car conference to be held at the Congress Hotel, Chicago, Sept. 14 and 15 under the auspices of the National Association of Automobile Show and Association Managers, will have a threefold purpose, as follows:

To present practical ideas and bring about a discussion of association or cooperative handling of the used car question in a dealer community.

To present individual buying and selling of used cars in the same way.

To develop ideas for fall and winter sales promotion of passenger cars, with particular emphasis on plans which may be adopted to intensify interest and assure patronage of the winter shows.

The meeting will be presided over by R. E. Lee, secretary of the St. Louis Automobile Dealers' Association and acting president of the National Association of Automobile Show and Association Managers. There will be five or six speakers, among them L. B. Sanders, secretary of the Boston Used Car Statistical Bureau; and Guy S. Garber, president of the Saginaw Automobile Dealers' Association and author of the Saginaw plan.

Among the dealers who will discuss individual handling of used cars will be S. E. Comstock, vice-president and director of sales for Williams & Hastings, Detroit Hupmobile dealers, and B. B. Burns, of Decatur, Ill., used car dealer and president of the Illinois Automobile Trade Association.

SMOKY EXHAUST NUISANCE

CHICAGO, Aug. 17—Chicago's health commissioner has requested the chief of police to more strictly enforce the city ordinances forbidding the use of automobile cutouts and the emission of smoke from automobile exhausts within the city. In a letter to the police chief, the commissioner said:

"I am convinced that both the gasoline fumes and the unnecessary noises made through the failure of motorists to obey the anti-noise ordinance are a grave menace to public health."

RAILROAD TO USE GASOLINE CARS

CHATTANOOGA, Tenn., Aug. 18—The management of the Tennessee, Alabama & Georgia Railroad have announced that they will use gasoline propelled cars upon their system. The first cars will probably make their trips about Sept. 1.

This is one of the first roads in the south to use gasoline propelled equipment and the experiment will be watched with interest by the officials of other short line roads.

The Readers' Clearing House

Questions & Answers on Dealers' Problems

Engine Misses and Knocks; But Is Apparently O. K.

Q—We have a 1919 Ford in our shop which will not fire on cylinders No. 1 and 2. It will hit on all four if run about 20 m. p. h. or faster, but slower than that misses on No. 1 part of the time and No. 2 part of the time. We have ground all valves and put new ones in cylinders No. 1 and 2. The valve clearance is all right and there is good compression in all cylinders. We have put on a new timer, new wires, new plugs, new coils, in fact everything new except the coil box, also new piston rings.

With motor running idle it will miss continuously on No. 1 and when pulling in high gear slowly it will miss and jump and jerk. If the exhaust valve spring is held up a little, that is, so that it does not pull the valves shut so quickly it will fire on No. 1 while idling. We have also installed new valve springs. This car has been running this way for two months and several mechanics have failed to overcome the trouble. During the last week it has developed a peculiar knock when run about 15 m. p. h. or over with the spark set at the usual place, but if the spark is retarded all the way up it stops the knock but also loses power.

If the No. 3 spark plug is shorted with a screwdriver it will stop the knock, but if any other plug is shorted it merely reduces the knock somewhat. Connecting rods were taken up about two weeks ago. The knock sounds as if a valve was being driven onto its seat with a heavy hammer. Sometimes it knocks rapidly and will then stop for a few seconds, then maybe it will knock just two or three times and will then quit for a while.—Reily Garage, Reily, Ohio.

First Test Ignition

Would first suggest your checking the ignition by seeing the actual performance. To do this get all of the wires loose on the spark plugs so that they can be easily removed without getting a shock. Then start up the engine and, with it idling and in such a condition that the missing is noted, take one of the wires at a time and hold it off of the spark plug and within 3/16 inch of the engine. Each time the timer makes contact for that particular cylinder there should be a short series of sparks jumping from the live terminal to the engine. You can count these as they jump, 1, 2, 3, 4, etc., and should be able to count up to 50 or 60 without noticing that the spark misses.

Should you count the sparks up to 8 or 9, however, and then find that it drops one or two and then sparks a few more and then drops one or two it would be sufficient cause for the trouble you are having. After checking the ignition and making sure that it is in good condition it is then time enough to check up on other details. At one time we knew of a car which behaved somewhat as yours is doing and apparently with everyth'ng in good condition nothing would work. It was eventually found that there was minute thread of waste in the carbureter which kept the needle valve open so that the float could not close it. This resulted in too rich a mixture which continually fouled up the plugs and caused missing and jerking which was very puzzling at the time.

A symptom of this condition is heavy black soot on the insulators of the spark plugs combined with the fact that the car may run better when it first starts than it does when it warms up, due to the fact that the car can stand a richer mixture when the engine is cold then it can when the engine is hot. The essentials for the operation of a motor consist of having good compression in all cylinders, a spark in each cylinder at the right time and the correct mixture in each cylinder. You say that you have good compression in all cylinders. The next thing is to see that you have a spark in all cylinders and also at the right time. As you have previously checked the spark, it would now be well to check the timing in each cylinder.

This can be done by connecting the battery so that your coils will operate on battery ignition. Then turn the engine over slowly by hand with the spark plugs removed and see that with the lever in the retard position that each coil begins to buzz just as the piston is about on dead center or barely started down after reaching dead center. If there is any question about the carbureter we would suggest that you try one taken from a Ford car which you know is operating properly, and would also suggest your using the intake manifold from the other car and installing new gaskets or thoroughly shellacing the old ones so as to make sure there are no air leaks either between the carbureter and intake manifold or between the intake manifold and the cylinder head.

To Check Carbureter Operation

A check on the operation of the carbureter would be to see if you can turn down the needle valve to the point where you can get the mixture too lean, as would be indicated by popping back in the carbureter. If you cannot do so it is quite likely that the carbureter is flooding to the extent of making the mixture too rich. The following list of possible causes of knocks may be of interest:

1. Loose connecting rod bearings.
2. Connecting rods bent.
3. Connecting rods twisted.
4. Loose wrist pins or worn wrist pin bushing.
5. Carbon knock, aggravated by spark advance and either too lean or too rich a mixture, which causes excessive heat in the cylinder.
6. Spark knock due to timing being advanced too much. Aggravated by carbon in cylinders.
7. Fuel knock due to present day low gravity fuel. Aggravated by high compression. Noticed more in slightly carbonized engine than in one recently cleaned.
8. Piston slap due to worn pistons having too much clearance between cylinder and piston. Aggravated by carbon in cylinders.
9. Main bearing knock, due to loose bearings.
10. Loose camshaft bearings.
11. Main bearing knock due to bent crankshaft.
12. Bent camshaft.
13. End play in crankshaft.
14. Loose flywheel.
15. Timing gear eccentric or off center so that it binds as it turns.
16. Gasket knock due to gasket being slightly out of place.
17. Cam with flat spot on heel.
18. Motor loose in frame of car.

While it is possible that any of the above may be causing the trouble, we think that a strong possibility is in loose camshaft bearings or in a bent camshaft. However, should you have occasion to overhaul the engine you can check for the above conditions.

The Readers' Clearing House

THIS department is conducted to assist dealers and maintenance station executives in the solution of their problems.

In addressing this department, readers are requested to give the firm name and address. Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Addresses of business firms will not be published in this department, but will be supplied by letter.

Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by MOTOR AGE organization in conference.

Architectural Service

IN giving architectural advice, MOTOR AGE aims to assist its readers in their problems of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and, in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelligent handling of the job. Among other things, we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

And how much of an accessory department is anticipated.

Locating the Stockroom.

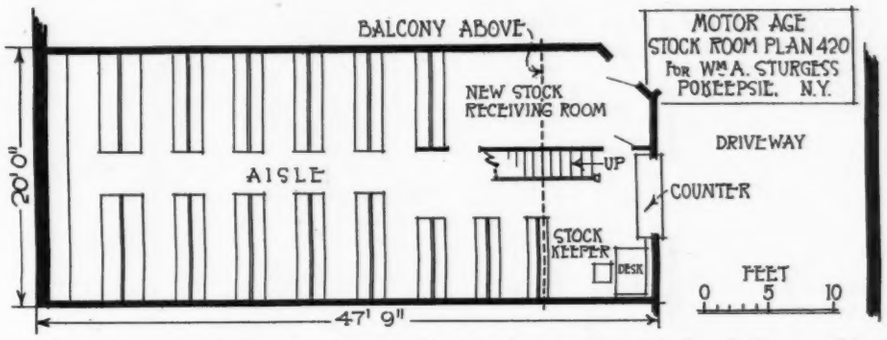
PLAN 420

Will you kindly suggest a layout of the stockroom, the location of which is shown in accompanying rough sketch. The entrance to stockroom is from the driveway shown on sketch. I do not want an entrance to stockroom from showroom. Your help will be greatly appreciated.—Wm. Sturgess, Poughkeepsie, N. Y.

Since you have your office on a balcony and have plenty of head room, we would suggest that you build the stockroom the same way, thus avoiding excessively high bins and at the same time gaining a maximum of storage space.

This layout would be very economical of the stockkeeper's time. The necessary room being immediately beside the delivery counter, he can make use of every moment when not busy serving customers, to get new stock sorted, checked and distributed.

Large bulky parts that are not moved so often are kept at the back in order to cut down on the number of long trips. Fenders and extremely bulky parts are kept on the balcony.



A stock room located under a balcony with low bins, easily reached and all accessible

MASTER VIBRATOR IGNITION FAILS WHEN LAMPS ARE TURNED ON

Q—In attempting to get better ignition on a Ford car a master vibrator was used but the engine would stop if the head lamps were turned on when operating with this master vibrator. The master vibrator and Ford ignition system were operated both on dry cell current and on the magneto current, but the engine could not be run on magneto current while the magneto was supplying current to the head lights, although when running on battery the head lights could be turned on without causing any trouble. Is it necessary to use a storage battery if master vibrator is used?

1—Your trouble is doubtless in a magneto which is somewhat weak combined possibly with the use of a master vibrator in which the spring is slightly stiff so that it needs more voltage than the ordinary coils would require. All current taken from any generator no matter whether it is a direct current generator or a Ford magneto has the effect of lowering the voltage. The current therefore taken by the head lights apparently had the effect of lowering the voltage to the point where it was not sufficient to pull the vibrating contacts in your master vibrator apart.

This accordingly resulted in stopping the engine. With magneto in good condition and the master vibrator correctly connected it should not be necessary to use a storage battery for the ignition and it should be possible to use the head lights and ignition both operated from the magneto.

2—What functions do the Ford coils perform when they are shunted and a master vibrator is used? Do magnets in any way step up the current or transform it or does it merely flow through?

Functions of Ford Coils

2—There are no magnets in the Master vibrator nor yet in the regulation Ford coil, although both contain soft iron cores which become temporary magnets only while current is flowing in the coil around them. In the ordinary vibrating coil ignition system such as is standard on Ford cars the current from the magneto flows through the primary winding around the soft iron core causing it to be temporarily magnetized.

This magnetic condition pulls the vibrator contacts open. This stops the flow of current thereby demagnetizing the soft iron core. By the use of a condenser connected across the interrupter contacts the demagnetizing action is so sudden that a very high voltage is induced in the secondary or fine winding and this sends the spark to the spark plug. As soon as the spring causes the contacts to close the action is repeated and the vibrating condition obtained gives a shower of sparks to the spark plugs as long as the timer is in contact with the segments connected to that particular coil. The only effect that a master vibrator has is to eliminate the use of a vibrator on the regular coil, the master vibrator containing an iron core, a single coil of wire, a pair of vibrating contacts and a condenser. In your question you mentioned the Ford coil being shunted.

This is not correct as the master vibrator is connected in series not in parellel and the regular vibrating contacts are held tightly together so that they cannot operate. Under these circumstances the magnetic winding in the master vibrator produces the vibrating action of the points while the primary winding in the regulation coil produces the high voltage in the secondary.

3—We understand that a very high compression in a motor cylinder will cause ignition. Some writers tell us that pressure produces heat. Is this a fact? We know that water freezing in a metal cylinder will produce enough pressure to burst it; but obviously there is no heat produced. In operating a tire foot pump, the barrel becomes hotter at the bottom than at the top and as this is the point at which the air goes out through a small connection through the hose we feel that the heat is due to friction rather than compression. — Jno. V. Loeffler, Evansville, Ind.

Cause of Pre-Ignition

3—You doubtless refer to what is known as pre-ignition which is unusually produced by either carbon or some projecting pieces of metal becoming red hot. This is not necessarily produced by high compression but may be produced by a retarded spark or a mixture which is too lean or too rich combined with the presence of carbon or a projecting piece of metal. The projection or carbon becomes incondescent or red hot and when the piston comes up on the compression stroke the mixture reaches a point where it is fired by the red hot particle, so that even with the ignition turned off the engine may continue to run. It was on this principle that old type hot tube or hot bulb engines were first operated. Pressure does produce heat and the heat at the bottom of the pump is due to the fact that the pressure is greatest.

For example if you start with the piston in a tire pump all the way at the top we will say there is the same pressure as in the atmosphere. With the piston half way down we have double the pressure. With the piston three-quarters down we have four times the pressure, so that you can see the farther down the piston goes the greater the pressure becomes. This and not the friction accounts for the bottom of the tire pump getting hotter than the upper portion. The bursting of a cylinder due to water freezing is due to the fact that water shrinks or occupies less space as it cools off until it gets to a point a few degrees above the freezing point. From that point on it starts to expand as it gets colder so that the ice which is formed occupies more space than water a few degrees above freezing point. This peculiar condition accounts for the bursting of cylinders due to water freezing.

The density of water at various temperatures is shown below from which table it can be seen that the expansion from 39.2 degrees F. down to the freezing point is the same as if the water had been heated up to 46.4 degrees.

Degrees Fahr.	Density
32.	.99988
35.6	.99997
39.2	1.00000
42.8	.99997
46.4	.99988
50.0	.99974
53.6	.99955

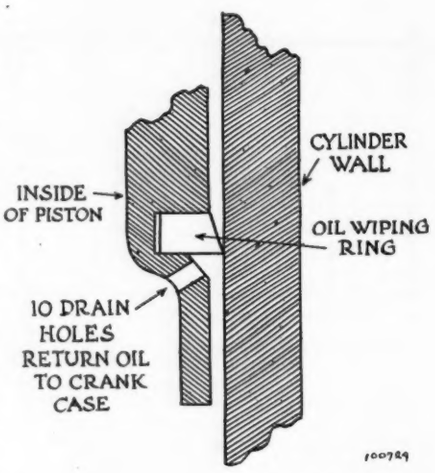
HUPMOBILE OIL CONSUMPTION

Q—We have a Hupmobile touring car, series R, model 1922, which is seven months old and has been driven 6000 miles. This car has been giving splendid service except that it consumes an excessive amount of oil, as we can only make from 40 to 50 miles on a quart. When the car was new the oil was drained out every 250 miles up to the 1500 mile point and was never driven faster than 15 m.p.h. From that point on it was not driven over 20 m.p.h. until the 2500 mile point was reached.

We have used two different kinds of oil, at first using Mobile A and then shifting to Sunoco extra heavy for summer use. When the car reached the 6000 mile point the spark plugs were removed and were found to be perfectly dry and had very little carbon on them. We checked up the engine for leaks but could not find that there was an oil leak anywhere. What remedy would you suggest?

1—We are advised that the oil consumption should be only about one-half as much as you state so that you should get from 75 to 100 miles on a quart of oil. Wherever a car is consuming oil excessively the loss must be due either to leaks or to its working up past the pistons and burning in the combustion chamber. As you state that the oil is not leaking, it must be that it is working up past the rings in spite of the condition of the spark plugs for it is possible that with good firing condition the oil is being consumed thoroughly and does not appreciably soot up the plugs. If you have opportunity to do so, would suggest that the pistons be removed and an oil scraping ring installed in the bottom ring groove.

It would also be well to chamfer the lower corner of the lower ring groove as shown in the sketch above and then drill about ten ⅛-in. holes from this chamfered corner to the inner side of the piston. The use of an oil wiping ring which has a slight bevel to it will then scrape oil from the cylinder walls and return it through these drain holes to the inside of the piston where it will



PISTON RING INSTALLATION TO REDUCE OIL COMPRESSION

fall back into the crankcase oil supply. On one Ford car in which we know of this system being used, the oil consumption was changed from one quart every 100 miles to one quart every 250 to 300 miles, so that we feel that you should have a similar improvement in your case.

INSTALLING STURTEVANT AIRPLANE ENGINE IN FORD

Q—We intend to install a Sturtevant eight cylinder airplane engine in a Ford truck frame. That is, the regular Ford side members will be used to lengthen the wheelbase of the chassis sufficiently to accommodate the engine if possible. We also intend using a regular Ford rear end and front end in connection with a Ford transmission. Our biggest problem has been the arrangement of some means to connect the transmission to the Sturtevant engine, together with some methods of operating a generator for the charging of the storage battery, as we intend to use a Ford starting and lighting system. Any suggestions will be appreciated.—F. G. Smart Auto Co., Pine Bluff, Ark.

It is comparatively easy to attach the Ford transmission onto the Sturtevant engine. It is only necessary to mount the regular Ford flywheel on the Sturtevant engine propeller hub. This, of course, assuming that you intend to retain the geared down feature of the engine. As you will recall, this engine operates at a normal speed of 2200 revolutions and is geared approximately two to one, so that the propeller shaft operates at 1100 r.p.m. at 2200 revolutions of the engine crankshaft.

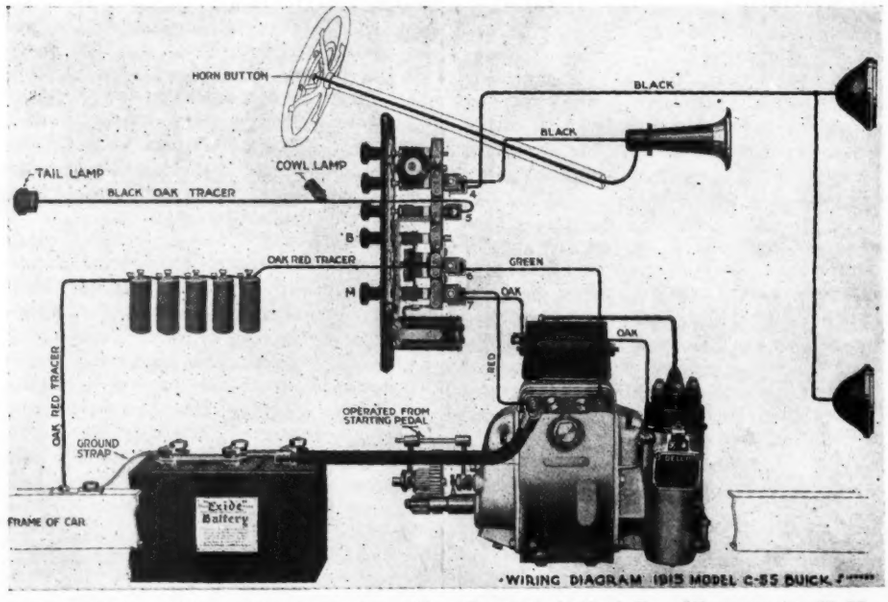
Although the geared down feature of this engine is amply strong to take the torque of the Ford chassis you will note that it will develop considerable noise and we believe that the better arrangement, although by far the most costly, would be to mount the flywheel directly on the engine crankshaft. In case the flywheel is mounted on the engine crankshaft it will be necessary to construct a new crankcase end cover in order to inclose the crankshaft and the space which was occupied by the reduction gear.

In mounting the Ford flywheel on the propeller hub or on the crankshaft it is necessary that it be exactly centered and after centering the flywheel, propeller hub and propeller hub shaft should be placed on a balancing way and carefully put in static balance. If the noise is not objectionable and the best installation with the least amount of money is desirable it is advisable to mount the flywheel on the propeller hub flange and retain the gear reduction. By retaining the geared down feature of the engine however, it will be necessary to change the gear ratio in the rear axle if any amount of speed is desired. The generator may be mounted on this engine by constructing a bracket and coupling connected to the front train of gears at the point where the magneto is now driven.

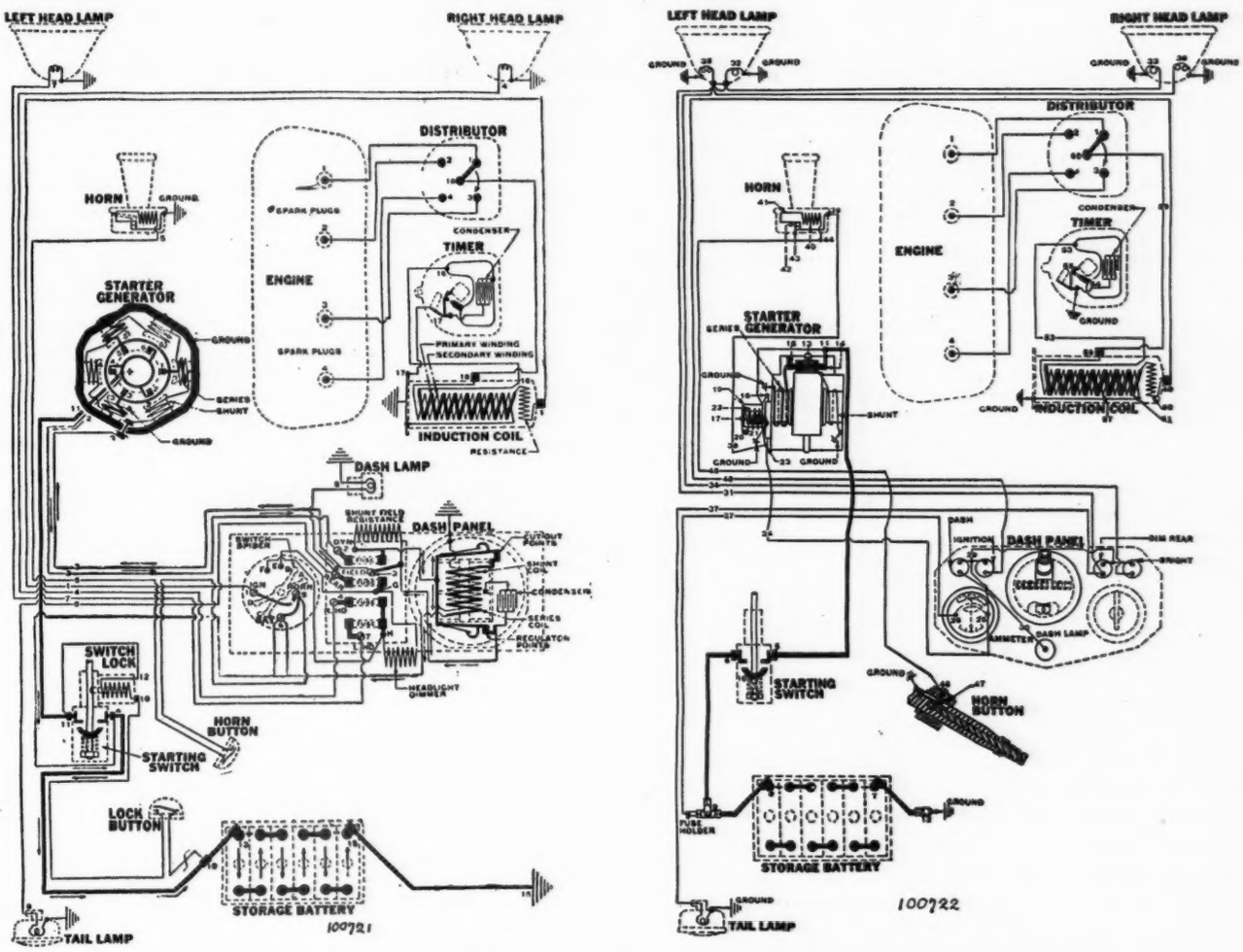
The generator shaft should be equipped with a coupling that will mate with the magneto drive end coupling which will allow for mounting of the magneto at the rear of the generator. With the magneto mounted at the rear of the generator and generator being driven from the original magneto installation it will be seen that the generator will not cut in until the engine is operating at approximately 1,200 r. p. m. The Ford generator on the Ford engine operates at about one and one-half times engine speed but with this installation it will be operating at one-half engine speed and will not be very efficient at low car speed.

Another possible installation is to lengthen the extension to the magneto driveshaft and above the magneto construct a shelf on which the generator can be mounted. It should be driven by means of a silent chain using gear ratio that will give the proper speed to the generator. We shall be pleased to offer any further suggestions if you will acquaint us with the dimensions of this engine and also the dimensions of the chassis in which you intend to install it.

Wiring Diagram of C-55 Buick



Q—Publish wiring diagram of 1915 model C-55 Buick.—Carl Schultz, care of Taupert Optical Co., Albuquerque, N. M. Diagram requested is shown above.



Wiring Diagrams for Maxwell Cars. Left: 1918 Model. Right: Late 1919 Model

MAXWELL ELECTRICAL TROUBLE

Q—Publish correct wiring diagram for a Maxwell 25 serial No. 249501. This car has evidently had the old instrument board with the cutout in same and a new type has been apparently put on with the cutout at the side of the dash. He is using the 2 wire 12-volt battery, that is, one wire is grounded and the other runs to the starting switch. The ground wire on the motor generator was placed on the main terminal of the generator. Would that be proper with the cut-out on the side of the dash?

The wires in the brushes have all been burned loose. When cutout points are closed they stick together even though they have been filed perfectly clean. It seems he has had trouble with this generator and cutout ever since the change in cutout and instrument board was made. We intend to install new brushes in generator and would like to get the correct wiring from the motor generator to the cutout and battery as soon as possible.—Skandia Garage, Skandia, Mich.

As we are not perfectly certain as to the exact type of wiring on the car in question we are showing above two wiring diagrams, one of which covers the 1918 Maxwell and is also correct for some of the early 1919 cars except that on these the switch lock and lock button were omitted. The rest of the diagram however is the same so that this can be used in working on the car in question. However, should it be one of the later 1919 models the other diagram which is marked 1919 will apply. This generator itself and as the regulation used was third brush there is no separate regulator.

One reason that we are not certain as to the exact model is that you state that a new type was used with the cut-out mounted at the side of the dash and we are informed that no Maxwell cars were made this way. It is however possible that some one working on the car has taken the cut-out off of the motor generator and put it on the dash and this should make no difference if the cut-out is properly connected. In making a change of this kind it would be necessary to connect from the frame of the cut-out or ground to some metal part of the car or engine or possibly back to one of the end bracket screws in the motor generator.

From the main or insulated brush which normally has the starter current carried to it a lead should go to the cut-out and the other cut-out connection to ground will complete the circuit of the fine winding so that the magnetic effect will be able to close the cut-out points. There will be another terminal on the cut-out which will connect up to the ammeter so as to get a connection through the ammeter to the battery side of the starting switch. You mention a ground wire on the motor generator as being placed on the main terminal of the generator. This is possibly a mistake in the wiring as normally there is no ground wire on the motor generator unless reference is made to a lead coming from the cut-out which is grounded on the motor generator.

Possibly some wrong connection in the wiring has accounted for excess current through the brushes which has burned the connections loose. There are very few cut-out switches which will not stay closed if the points are held together when the engine is standing still. This is due to the fact that a very heavy discharge of current is drawn from the battery by the motor generator and this current goes through the reverse series winding in the cutout. While the series and shunt windings oppose each other under these circumstances the series is so much stronger that it may result in holding the points together. This is therefore no test as to the action of the cut-out and should not be tried.

The only test to make is to see whether the cut-out closes and opens properly when the generator starts and stops. The number of brushes will determine which diagram is the correct one to use. The six brush machine has three positive brushes and three negative brushes and uses the 1918 diagram with the voltage regulator. The five brush machine has two positive and two negative brushes the fifth brush being what is usually known as a third brush with which no regulator is required.

Electrical and Carburetion Questions on Overland

Q—What can be done to an Overland car model 80 to make it hit on all cylinders as it now hits on two most of the time when idling with the spark retarded?

1—One essential for good operation is to have good compression in all cylinders. Another essential is to see that the spark is good at all of the high tension wires and that the plugs are clean. The spark can be checked with the engine running by removing a wire from the plug and holding it within 3-16 inch of the engine, this test being made at all four spark plugs. If the spark will jump 50 or 60 times without missing it is no doubt in good condition. It is possible that the trouble is in the carbureter or in air leaks in the manifold, the latter being checked by squirting gasoline on the manifold connection to see if any possible air leaks will draw in this gasoline. If so, a difference will be noted in the running of the engine. The present day fuel requires different carbureter construction and if an old carbureter is being used it might be well to replace it with a newer one or have it rebuilt at the factory. Old type manifolds exaggerate this condition and some times give trouble of this nature.

Generator Charging Rate Fixed

2—What can be done to the Auto-Lite generator used on this car to make it charge more at low speeds and not charge any more at high speed?

2—This generator has a reverse series field so that the output cannot be varied and as far as we know there is nothing that can be done to it to vary the charging rate at low speed without affecting it at high speed. Even so a change would have to be made in the windings. The characteristics of a generator are determined when it is designed and it cannot be changed afterwards.

Starting Motor Trouble

3—What is wrong with any starting motor when it will not turn when in a certain position but does not bind anywhere?

3—This is doubtless due to an open circuit, probably a lead in one or more of the commutator bars being insecurely soldered.

Soldering Broken Radiators

4—How is a radiator repaired with solder being poured on it from a ladle?

4—The most important point in any soldering operation is to have the parts clean and flux carefully applied and this holds true in repair of radiators. A good article on radiator service appeared in the November 3, 1921, issue of Motor Age, and additional suggestions will be given by letter.

When a Cut-Out Will Not Open

5—Why is it that a cut-out will not open unless the battery wire is disconnected?

5—Cut-out points staying closed when engine stops may be due to a reversed series winding in the cut-out. This would however, cause a vibrating action of the contacts when the engine speeds up and the generator tries to charge the battery. Another cause is a weak spring or an air gap which is too close, that is, the moving part of the cut-out or armature comes down too near to the iron core this accounts for your trouble as the armature will freeze to the core. The remedy is to adjust the contacts so as to hold the armature farther away from the core. Then if the cut-out closes too late the spring can be weakened slightly.

Engine Gallops When Idling

6—What is wrong with a Ford engine when it gallops as if it were getting too much gas when idling, but the mixture is all right as it hits perfectly on a hard pull?

6—This may be due either to air leak around the gasket between carbureter and intake manifold or at the junction at the intake manifold to the cylinder block. This can be determined by putting gasoline around the opening to see if suction draws it in and affects the operation of the engine. If this is the case new gasket should be used. It is also possible that an old type Holley carbureter is being used in which the choke or venturi is the wrong size, as for present day fuel the 13-16 inch choke is being replaced with 23-32 inch choke.

Engine Misses When Idling

7—Why will some engines hit perfectly when pulling but miss when idling?

7—This may be due to air leaks, the use of old type carbureter or to long manifolds which do not feed the gas evenly to all the cylinders.

The Use of Distilled Water

8—When should a battery be charged with nothing but distilled water in it?

8—When a battery has been allowed to become badly discharged and is bone dry it is possible to charge it with nothing but distilled water in it. The only exception to this rule is when the condition is so bad that the current will not start to flow. Under these circumstances it is necessary to put a slight amount of acid in the water to make it conducting in order to get the current started. The charging action will drive the sulphate out of the plate and change the water gradually into acid which becomes stronger and stronger so that it may be necessary when the battery is partially charged to dump out the electrolite thus formed and again put in distilled water.

Variations in Generator Charging

9—Why will a generator charge more or less at different times when the car is being driven?

9—Various conditions affect the operation of the generator. For example the battery voltage with types of generators having voltage regulation will control the output to a great extent. With a third brush machine the battery voltage also controls the current, a charged battery producing a greater output than a discharged battery which holds the field voltage down to a low value. In third brush generators the exact contact of the brush on the commutator may vary from time to time which will also change the charging current. When a generator is hot it will also charge less than when it is cold due to change in resistance in the winding with heat.

Intake Manifold Affects Mixture

10—Why is it that two cylinders take more gas than the other two to make them fire when there are no air leaks?

10—We assume you refer to the fact that a slightly different carbureter adjustment is necessary to make two of the cylinders fire compared with the adjustment which is exactly right for the other two. This is due to the fact that one intake manifold is supplying mixture to four different cylinders and the distance from the carbureter to the cylinders varies. There is a tendency for the gasoline to settle out of the vapor or condense as the mixture is drawn through the manifold so that the farther it has to go the leaner it will be. For this reason No. 1 and No. 4 cylinders may get a slightly leaner mixture than No. 2 and No. 3 which may show up on the No. 1 and 4 exhaust valves having a greater tendency to warp due to the extra heat in No. 1 and 4 cylinders with a leaner mixture. Variation in pressure in the manifold which depends on the suction produced by the firing order will also have an effect on the mixture. This condition being such that on racing cars it is sometimes necessary to use a carbureter for each pair of cylinders to get good results.

Correcting Polarity of Generator

11—If the polarity of a generator is reversed what is the best way to get it back in shape?

11—Connect the battery properly in the car and close the cut-out points by hand. This will invariably magnetize the generator in the right direction.

Causes of Reversed Polarity

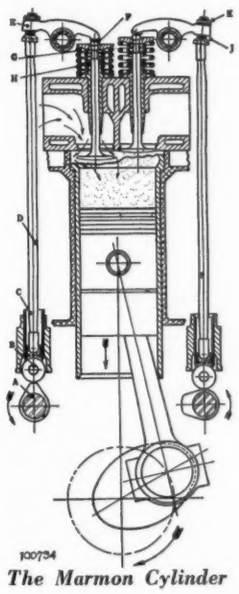
12—How does the polarity of a generator become reversed?—A subscriber, Ravenna, Neb.

12—The most likely way for a generator to become reversed is by having it off of the car and tested on a test bench where the battery is connected just the opposite way from on the car. This magnetizes the fields the wrong way and it then builds up the wrong way on the car. To guard against such a condition however, it is safe to always close the cut-out points once by hand after a generator has been replaced on the car or when the battery has been replaced.

Removing Marmon Cylinder Sleeves and Timing Gears

Q—Give complete instructions for removing and replacing pistons and sleeves, also for removing and replacing timing gears on Marmon 34-1919.—Murphy Auto Repair Co., Independence, Kans.

A general idea of the Marmon construction which uses a sleeve in the cylinder can be obtained from the accompanying sketch. On the 1919 cars the connecting rod is designed so that piston and rod can be removed from the top of the cylinder after the cylinder head has been removed. This of course involves removing connecting rod caps and in doing so care should be taken to observe the way they are put on. The connecting rods are numbered on a small boss the same as the pistons, and the side of the rod carrying this boss should be toward the rear of the motor.



The Marmon Cylinder

In taking the rods loose from the crankshaft care should be used to see if they are installed as above described as it is fatal to the fit of a bearing to turn the cap around. Removing the sleeve can be accomplished by the use of a piece of 2 by 4 and a jack placed under the car so as to force the sleeve out through the top of the engine. Before this is done however, it is necessary to loosen the gland at the bottom of the sleeve which both holds the sleeve in place and also seals against leakage from the cooling system into the crankcase.

As we understand it the 1919 Marmon engines have only the cylinder sleeve separating the combustion chamber from the cooling water so that when the sleeve is replaced it is necessary to use new gaskets and make sure that the packing at the bottom of the sleeve is not disturbed. It is accordingly necessary to draw up the nuts which hold the packing gland and yet they must not be drawn up too tight or the sleeve will be drawn out of shape and will cause the piston to bind. As this is rather a delicate operation it is recommended that wherever possible an engine requiring work of the character be sent to the nearest Marmon branch which in your case would be at Kansas City.

In order to remove the timing gears it is necessary to take the engine out of the car and turn it up-side-down as the engine does not have any front cover on the crankcase, and the gears must be withdrawn from the rear. Before taking the old gears out punch marks should be made unless some are already visible. Then when the new gears are installed they should be compared with the old ones and similar punch marks applied taking care to get them in the same position with respect to the keyway. The new gears will then give the same timing that the old gears provided. At a large Marmon service station pullers are used for the sleeves but these are rather complicated and expensive to make and it would probably eat up the profit on several jobs if a small shop attempted to do this work by means of a puller.

VALVES IN HEAVY DUTY ENGINES

Q—What kind of valves should be used in heavy truck engines? Which will warp and pit in the shortest time, a valve with cast iron head or an all steel valve?

1—There is not much choice as either valve gives satisfactory operation, there being a slight tendency to use Tungsten steel valves.

2—How are bearings hand burnished? What tools are used, and how are they used?

2—Hand burnishing is used after a bearing has been scraped or otherwise fitted as well as possible. The tool used is a piece of round bar steel possibly 5/16 inches in diameter and curved up slightly at one end. It is merely rubbed back and forth over the surface of the bearing and serves to give it a hard and glassy appearance and also a toughness on the surface which makes it operate for a long time without appreciable wear. This being a hand process, is not often used except in the case of high class jobs.

3—What would cause the head of a Chevrolet valve to burn off so that the valve head would fall into the cylinder and damage the piston?

3—We do not know of there being any characteristic trouble of this nature and should this occur it would possibly be due to the valves being used for too long a period so that the heat from the engine had excessively weakened the stem.

4—Does the Chevrolet use valve with cast iron heads?

4—This is the type of valve being used to the best of our knowledge.

5—Where is the Liberty air plane motor made, and by whom?

5—The Liberty motor is no longer being manufactured. The Liberty motor was made by different automobile factories among which were Buick, Marmon, Packard, Lincoln and Ford. Various parts, however, were made by other concerns.

6—Would you recommend Dowmetal pistons for use in a touring car for all kinds of service, or are they best suited for racing?—C. R. Kimble, Artesia, Calif.

6—This information will be given by letter.

GABRIEL SNUBBER ADJUSTMENT

The following service bulletin has been received by MOTOR AGE and should be of interest to those having to do with the maintenance of cars on which rebound snubbers are attached. The bulletin is as follows:

Service Bulletin No. 94

July 13th, 1922.

To all Distributors and Dealers:

SUBJECT: Loose Snubber Straps

Loose snubber straps are invariably the cause of improper and inadequate snubber action. Snubbers should be readjusted after the first 500 miles. Any Gabriel snubber service station will make this first adjustment without charge.

To properly adjust snubbers, proceed as follows:

1. Pull belt out of snubber housing as far as possible, or until the coil spring within the snubber is entirely compressed.

2. Let the belt return into the cup 2 inches, but no more, and place a wooden wedge between the belt and cup at the top of the cup opening to hold belt in place, thus leaving slack between the snubber and axle.

3. Remove clamp and shorten (cut) belt at axle so as to make it taut.

4. Tighten clamp and remove wedge.

There will be considerable lost motion in the snubber action unless the belt clamp is within 5/8 in. of the axle bracket.

C. H. Wills & Company.

Service Department.

It might be further added that this work may be done by hand on the smaller size snubbers such as used on Ford and other light cars, but that the 2 inch figure should be made 1 inch or 1½, as when working by hand all of the strap will not be pulled out. On the larger type snubbers it will not be possible to do the work by hand and it is customary to take the snubber off the car and hold it in a vise or some other attachment where the strap can be securely held. As a suggestion the strap might be held in the vise as it would be fairly easy to get a good hold on the snubber case. If desired the cap screw can be loosened at the side of the snubber to remove the inspection plate which will make it possible to see the coil spring and determine just to what extent it has been wound up.

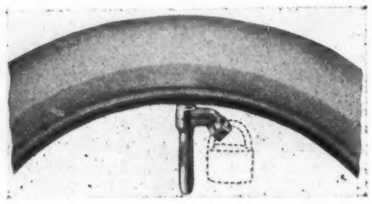
As received by the service stations from the Gabriel factory the snubbers are properly set by having the belt pulled out to the point where there is just a two inch length remaining inside. A nail is then put through the belt which prevents the spring drawing the belt into the housing. When assembled on the car, the belt is drawn up so that it is just snug, and the clamp is tightened. The nail is then withdrawn. For this reason when making adjustments it is well to draw out the belt until the nail hole is just seen as it is quite difficult to really pull the belt all the way out.

The ACCESSORY SHOW CASE

New Sources of Retail Profit

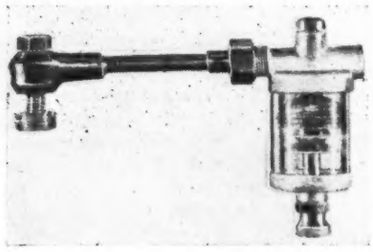
IMPERIAL SPARE TIRE LOCK

A spare tire lock which consists of two brass lugs fits over the valve stem and engages the threads. An ordinary padlock fastens the lugs together and locks the tire to the carrier. The lower lug prevents anyone from letting air out of the tire. Price, $1.25 and $1.50. Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.



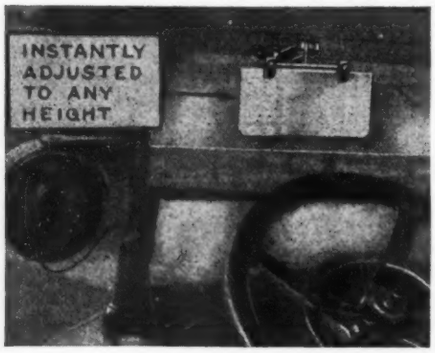
VAN GASOLINE FILTER

The gasoline filter shown here is a visible type which can be installed without the aid of a mechanic. It indicates a leak in the supply pipe, between the filter and tank, or that the tank is empty, by bubbles in the filter. Harris Co., Inc., 89 State St., Boston, Mass.



SECURITY GLARE ELIMINATOR

This is a colored glass shield attached to the top of the windshield through which the glare of the passing cars is neutralized. Made for all types of cars in various colors of glass. Price $2.50. The Security Mfg. Co., 263 Central Ave., Rochester, N. Y.

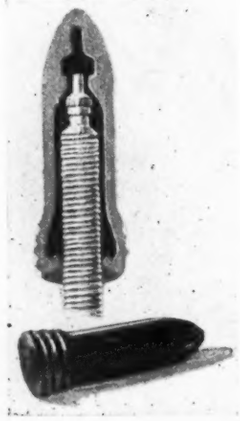


ANTISHOK

A new type of shock absorber is being sold under the name of Antishok. It is designed to give a three point shock distribution at each wheel and increases the spring length to 250 in. It is distributed by the Gunther Sales Co., Quincy, Ill.

EKHO SPRING SHACKLE BOLTS AND CABINET

A complete line of spring shackle bolts with display cabinet is manufactured by the P. H. Webber Co., Hoopeston, Ill. The cabinet contains 24 sizes of bolts, 113 bolts per cabinet. The 24 sizes will fit 310 models of cars. A list is furnished so that the bolt desired may be instantly located in the cabinet. All bolts are carbonized and case hardened and made to close limits. They are tapped ⅛ pipe tap to accommodate any standard grease cup or pressure greasing system.



DURAL SLIP-ON DUST CAP

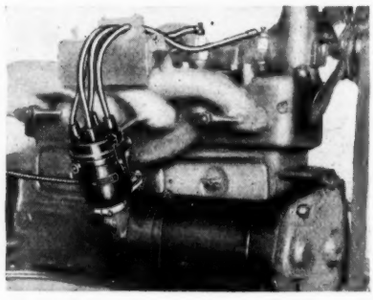
The Dural Slip-On Dust Cap is manufactured by the Dural Rubber Corp., Flemington, N. J., of specially treated and vulcanized rubber. It slips on or off of the valve cap without turning or twisting and is held by the gripping quality of the inner surface. It is made in two sizes. Price 40 cents and 50 cents.

LUBIN GAS AND STEAM SIGNALS

Robert Marcus Co., 1755 Broadway, New York, has introduced gas and steam signals which are bells, fitted to radiator or gas tank. The steam warning is placed right on the radiator cap and when the engine reaches the danger point in heat, the bell rings. The gas signal attaches in the same manner to the gas tank and warns of running out of fuel. Price of each, $2.

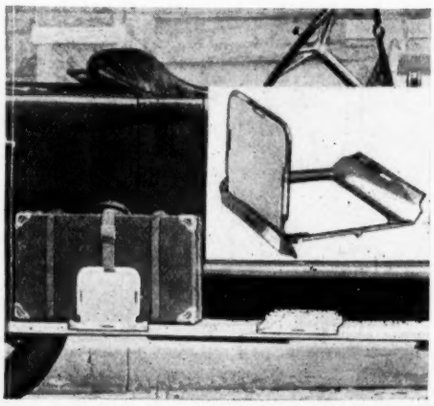
BOSCH BATTERY IGNITION SYSTEM

The American Bosch Magneto Corp. has designed a battery ignition system, the distributer and interrupter of which is shown here, this being especially called by the Bosch corporation a compensating governor which it is claimed entirely eliminates the necessity of operating the spark advance lever.



BRINCK STEP PLATE CARRIER

This is a combination step plate and luggage carrier for the running board. When used as a luggage carrier a hinged plate is swung back and a strap run through a slot in the upper edge and over the suitcase to another slot in the portion attached on the running board. Price $5.50 each with straps. Brinck Mfg. Co., Moline, Ill.

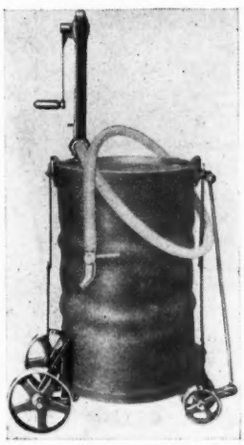


SERVICE EQUIPMENT

Aids for Time Saving & Accuracy

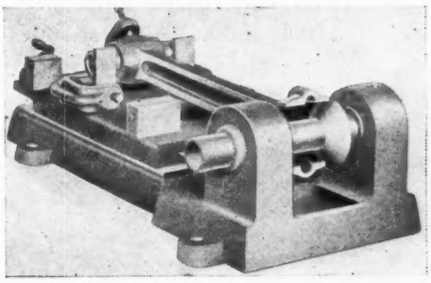
HANDY BEN ONE POUND GREASE INJECTOR

This One Pound Grease Injector is intended for use at the curb or service greasing station. It attaches to large or small size wooden barrels and half or full size steel barrels with a 2 in. bung. The Bennett Injector Co., Muskegon, Mich.



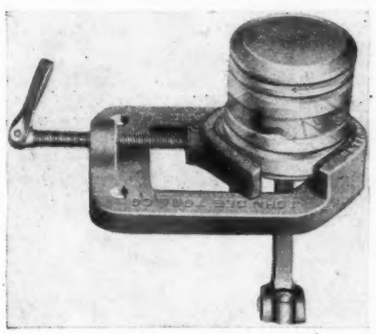
APEX PISTON RING COMPRESSOR

This device operates on the contracting band principle and has a range of from nothing to pistons of five inch diameter. The band is of phosphoer bronze spring steel and is corrugated for additional strength. The universal jointed shaft operates the steel spool to which the band is locked. Can be used for installing pistons either from above or through the bottom of crankcase. The Apex ring compressor is manufactured by the Thomson-Friedlob Mfg. Co., Peoria, Ill, and sells for $3.75.



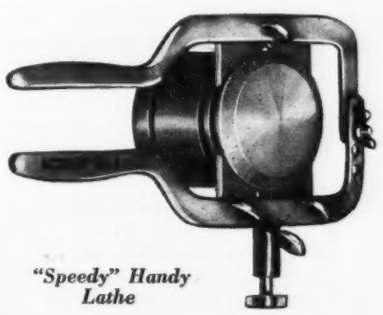
UNIVERSAL CONNECTING ROD ALIGNER

A jig for aligning all connecting rods. It takes care of both twist and bend in a connecting rod without removing it from the jig. The "U" plate on the side of the jig enables the mechanic to determine whether the cross bore in the piston is correct or how much it is out of alignment. Price, $65.—John Dee Tool Co., Rock Island, Ill.



DEE VISE

This is a piece of equipment for holding circular parts such as pistons and armatures. When reaming for oversize wrist pins or installing new rings, it is especially valuable to facilitate work and prevent injury to the parts. The jaws are lined with brake lining to prevent scratching. Will hold any piston from 2½ to 5½ in. Price, $4.—John Dee Tool Co., Rock Island, Ill.



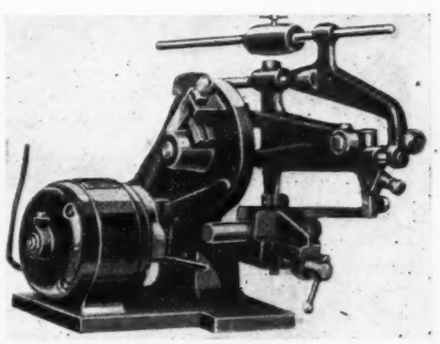
"Speedy" Handy Lathe

ROY'S VALVE LIFTER

This valve lifter is primarily intended for Dodge cars but can be used on other cars very readily. The forked end is placed under the valve seat and the base rests on the hood sill. The long handle gives the necessary leverage and a slight outward pull on the handle raises the valve. J. D. Roy Tool Co., Willimantic, Conn.

EDLUND PORTABLE HACK SAW

The cutting is done on the back stroke, the saw blade being automatically relieved on the forward stroke. Power is supplied by a small motor, direct connected, the power being transmitted through cut gearing. The machine is portable and can be attached to any electric light socket. Weight, including motor, 80 lbs. Edlund Machinery Corp., Cortland, New York.



"SPEEDY" HANDY LATHE

A small hand lathe, for small shop or road use, is made by the Auto Tool & Appliance Co., Peoria, Ill. This "Speedy" hand lathe cuts grooves, chamfers on all sizes and makes of pistons, removes carbon and widens grooves from .010 to .025 in. overwidth. The complete equipment sells for $15.

Opening of New Monza Speedway Set for September

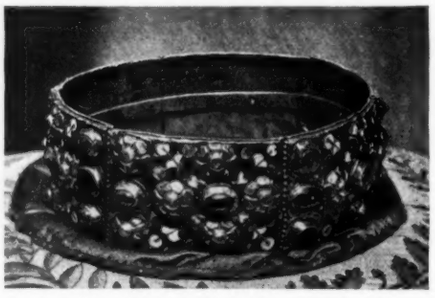
Track Near Milan, Italy, is Third Automobile Race Course to Be Built in Europe

PARIS, Aug. 4—(By Mail)—The stage is set for the opening of the new speedway at Monza, near Milan, Italy, when French, German, English and Italian cars will compete for 450,000 lira (normally $90,000) in cash prizes.

Begun in April of this year, the Monza Speedway, which is the third automobile race course to be built in Europe, the others being at Brooklands, England, and at Grunewald, near Berlin, will be thrown open for practice on Aug. 15, and the first race will be run on Sept. 3, followed by another race on Sept. 10. The track has been constructed in a former Royal park six miles from Milan and measures 10 kilometers 6.2 miles) round. It has two overlapping loops with connections from the inner to the outer loops by an underground passage. Opposite the main stands there are parallel tracks on which cars will run in opposite directions. Indianapolis has been taken as a model in laying out the inner oval. The straightaways are macadam and the turns are concreted. It is probable that the entire track will be concreted at a later date.

The more important of the two races, to be run on Sept. 10, over a distance of 500 miles, is for 122 cubic inch cars weighing 1,433 pounds minimum. Thirty-eight cars are officially entered for this race as follows: Italy, 3 Bianchi, 3 Fiat, 2 Diatto; France, 3 Talbot-Darracq, 3 Bugatti, 4 Rolland-Pilain, 2 Ballot, 1 Delage; England, 3 Sunbeam; Germany, 4 Benz, 3 Mercedes, 3 Heim.

The initial race, on Sept. 3, is for cars having a piston displacement of 91 cubic inches, with a minimum weight of 881 pounds. Sixty laps of the course will have to be covered, giving a distance of about 360 miles. There are 24 entries for this race.



The Iron Crown of Monza, used for crowning the first kings of Italy, the Emperor Carlo Magno and Napoleon I. The crown of gold, silver, iron and hard stones, is valued at about $4,000 and will be awarded to the winner of the Italian Grand Prix

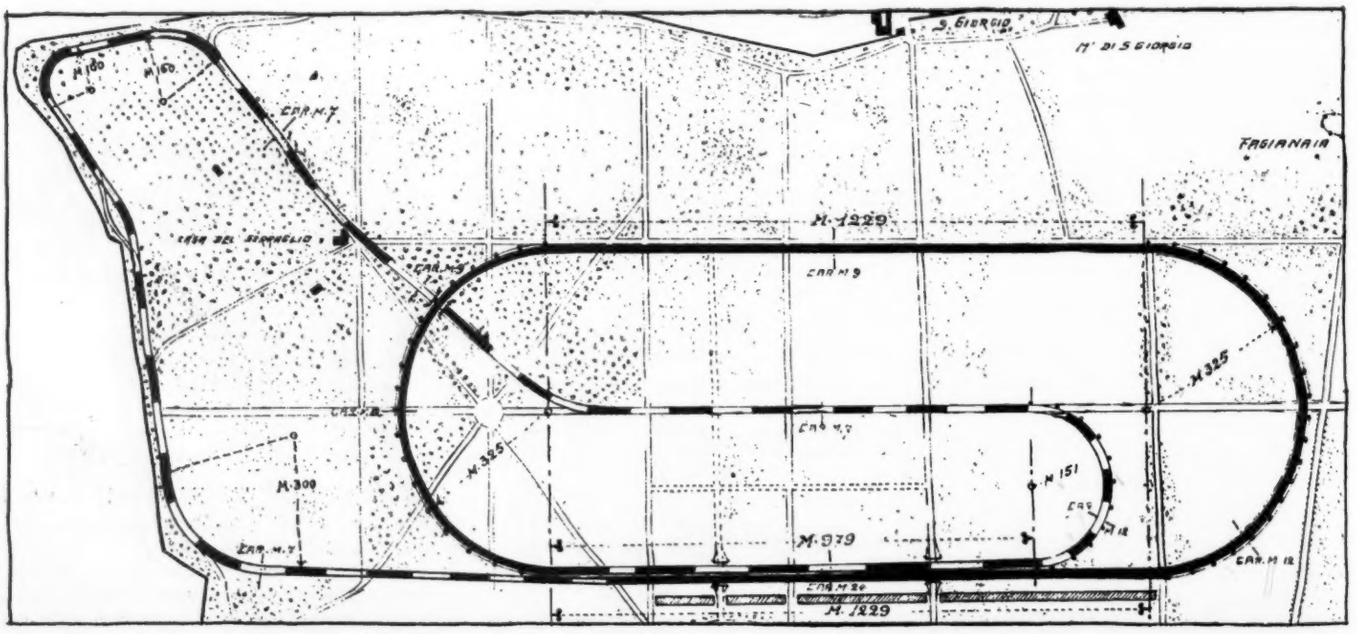
Italy, 5 Fiat, 3 O. M., 3 Chiribi; France, 4 Bugatti, 3 Talbot-Darracq; Germany, 3 Mercedes; Austria, 3 Austro-Daimler.

Fiat will run with a team of cars having a four cylinder engine of 65 by 110 mm. bore and stroke similar in all general features of design to the six cylinder 122 cubic inch engine which won at Strasbourg. The Chiribiris are four cylinder jobs of 65 by 112 mm. bore and stroke with steel cylinder construction, two valves per cylinder, and a couple of overhead camshafts. These engines run at more than 5,000 revolutions and have given off better than 70 hp. on the brakes. Their road speed is in excess of 100 miles an hour. In running order they scale 1,100 pounds.

Mercedes will run in the 91 cubic inch race with a new four cylinder job of steel cylinder construction, which was first seen at the Targa Florio race this year. This engine is designed to run with or without a supercharger, but the device will have to be left off under piston displacement rules. The Bugattis will be the standard four cylinder model and the Talbot-Darracqs will be the cars which won in the road race at Le Mans last year and in the 200 mile track race at Brooklands last Fall. The Austro-Daimlers have aluminum engines with steel liners and a couple of overhead camshafts operating two valves per cylinder.

Ten prizes, beginning at 50,000 liras and decreasing to 3,000 liras, in addition to four lap prizes of 5,000 liras each, will be offered in the 91 cubic inch race.

For the 122 cubic inch race there will be ten cash prizes beginning at 10,000 liras and dropping to 5,000 liras, three lap prizes, the Royal crown and gold medals.



This shows the layout of the Monza Speedway, the third automobile race track to be built on the continent of Europe. It is six and one-fifth miles round and will occupy a large section of the Royal Park which has been leased by the Automobile Club of Milan

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

Toronto	Canadian Nat'l Exhibition	Aug. 26-Sept. 1
Columbus, O.	Columbus Auto Dealers Co.	Aug. 28-Sept. 3
Decatur, Ill.	Industrial Exhibition and Automobile Show	Aug. 30-Sept. 9
Peoria, Ill.	Nat'l. Implement and Vehicle Show	Sept. 4
Minneapolis, Minn	Minnesota State Fair	Sept. 2-9
Indianapolis	Indianapolis Automobile Trade Assn.	Sept. 4-9
Wilmington, Del.	Delaware State Fair	Sept. 4-9
Hartford, Conn.	Connecticut Fair Grounds	Sept. 4-9
Spokane, Wash.	Annual Show	Sept. 4-9
Syracuse, N. Y.	New York State Fair	Sept. 11-16
Memphis	Memphis Automobile Dealers' Assn.	Sept. 23-30
Wash'gton, City of	Closed Car Salon	Oct. 21-28
Chicago	Annual Show of the Automotive Equipment Association	Nov. 13-18
Cincinnati, O.	Second Annual Automobile and Radio Exposition	Nov. 23-29
New York	Annual Show	Jan. 6-13
Cleveland, O.	Annual Winter Show, Cleveland Automobile M'f'r's. and Dealers' Assn.	Jan. 20-27
Chicago	Annual Show at Coliseum	
	N. A. C. C.	Jan. 27-Feb. 3
Minneapolis, Minn	Annual Show	Feb. 3-10

CONVENTIONS

Toledo, O.	Annual Convention, Ohio Automobile Trades Assn.	September
Buffalo, N. Y.	M. A. M. A. Fall Convention	Sept. 13-15
Chicago	Show Managers' Assn.	Sept. 14-15
Santa Barbara	Annual Convention, California Automotive Trades Assn.	October

FOREIGN SHOWS

Berlin	Kaiserdamm Hall	Sept. 25-Oct. 3
Rio de Janiero	Automotive Exhibition	Sept., 1922
London	International Commercial Vehicle Exhibition	Oct. 12-13
Paris, France	Automobile Show	Oct. 4-15
London	Annual Show	Nov. 3-11

RACES

Colo. Spgs., Colo.	Pike's Peak Race	Sept. 4
San Carlos, Cal.	500-Mile Armistice Day Race	Nov. 11

Broadway Motor Co. Opens in North Chicago

Music and Dancing Mark the Debut of the New Agency

CHICAGO, Aug. 18—The Broadway Motor Sales Co. opened its fourth motor car sales establishment in Chicago Thursday night with rather an elaborate function. The handsome store room was transformed into a flower-trimmed ballroom and there was music, dancing, refreshments, and the automotive display was limited to sport models and dolled-up cars of the Paige and Willys-Knight lines. The Jewett and Overland cars also will be sold here.

This salesroom is finished in a cream white tile, it has exceedingly high ceilings and a handsome indirect lighting system. It is quite a remarkable salesroom to be located as far out of metropolitan activities as 6335 Broadway, which is eight miles from State and Madison streets. The owners refer to this store as the "farthest north in Chicago." It is a coming neighborhood, however.

The Broadway Motors Sales Co., which is directed by the brothers Bernstine, is adapting the chain store idea to the motor sales work. In each of the stores a different line of cars is handled. There is a central maintenance department, which is run as an independent company. All except emergency service is sent to this company. Also such work as warehousing cars in off seasons and other overhead activities are cared for by special departments. A special department cares for the used cars.

These stores are located in different parts of the city and in communities that are expected to develop. The Bernstines believe that they have a new and profitable idea in metropolitan car sales and they expect to extend their store system until they are selling in some of their stores the better-known lines.

In their advertising they are making maintenance prominent, and over the spacious storage and maintenance department at the new store there is a sign "Service with a Smile."

Gasoline Consumption Increases 16 Per Cent

WASHINGTON, Aug. 18—Reflecting the increased use of automobiles as the result of the tremendous production during the spring and summer months, statistics compiled by the Bureau of Mines show that the domestic consumption of gasoline for the first six months of this year increased 16 per cent. The production of gasoline for June amounted to $525,940,600 gallons, an increase of 12,000,000 over May and 51,000,000 gallons over April. Domestic consumption for May represents an increase of 41 per cent in consumption as compared with the same month a year ago, while a similar comparison for June shows a 14 per cent increase, a more nearly normal figure. Stocks for June were 10 per cent in excess of June a year ago.

Imports of gasoline for June amounted to 3,986,655 gallons; exports were 52,730,889 gallons; and shipments to insular possessions were 1,872,776 gallons.

The output of lubricating oil for June was 80,138,257 gallons, which indicates a daily average increased production of 95,000 gallons. The seasonal demand for lubricants reduced stocks to a figure of 226,903,812 gallons on hand July 1, a decrease during the month of 39,000,000 gallons.

PATERSON CAR REDUCED

DETROIT, Aug. 19—W. A. Paterson Co., manufacturer of the Paterson car, has reduced prices on its open models $160, and on the enclosed cars $260. The new prices are: 5-pass. $1390; 7-pass. $1425; coupe $2395, and sedan $2395.

Cleveland Factories' July Production Ahead of June

CLEVELAND, Aug. 21—Production in Cleveland automobile factories and accessory making establishments increased slightly in July over June, according to the report of the labor relations committee of the Cleveland Chamber of Commerce.

The number of employes in 18 concerns manufacturing vehicles for land transportation that report to the committee was 2.7 per cent greater on July 31 than on the last day of June. There are a number of concerns making accessories in the 18 plants in this group that report to the committee.

The automobile industry continued during July to set the pace in volume of business for all others in Cleveland, according to this report, which shows that while automobile plants increased employes 2.7 per cent on July 31 as compared with June 30, the industries of Cleveland as a whole had 4.6 per cent fewer employes at the end of July than they had at the close of the previous month.

Toledo Sales Continue; Heavy Demand for Cars

TOLEDO, Aug. 19—"Every indication points to a continuance of the present heavy demand for cars," declared A. C. Barber, general sales manager of the Willys-Overland Co., returning from a trip through New England and North Atlantic states.

"We are convinced that there will be no slackening off in demand for cars, particularly if the present industrial unrest is smoothed out, as we are all hopeful that it will be.

"The present rush of orders will be maintained at almost an even level for some time to come. Settlement of the strikes and return of the farmer will make this an assured fact."

Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Acason	¾-1	$1650a	3¾x5	34x5n	34x5n	W
Acason...RB	1½	1950	3¾x5¼	36x3½	36x6	W
Acason...H	2½	2750	4⅜x5¾	36x4k	36x8k	W
Acason...L	3½	3450	4⅜x5¾	36x5k	36x10k	W
Acason...M	5	4350	5 x6¼	36x6	40x12	W
Ace...C	1½	2295	3¾x5½	34x3½k	34x5k	W
Ace...A	2½	2795	4¼x5½	36x4k	36x7	W
Acme...20	1	....	3¾x5	35x5n	35x5n	W
Acme...30	1½	....	3¾x5	34x3½	34x5	W
Acme...40	2	....	3¾x5	34x3½	34x5	W
Acme...60	3	....	4½x5¼	36x4	36x7	W
Acme...60L	3	....	4½x5½	36x4	36x7k	W
Acme...90	4½	....	4½x5½	36x5	40x10	W
Acme...125	6¼	....	4⅝x6	36x6	40x12	W
American...25	2½	3350	4 x6	33x4k	36x4dk	W
American...40	4	4275	4½x0	36x5k	36x5dk	W
Armleder...20	1	....	3¾x5½	34x3½k	34x6k	W
Armleder...21	1½	....	3¾x5½	34x3½k	34x6k	W
Armleder...40-B	1½	....	4¼x5½	34x3½k	34x6k	W
Armleder...40-C	1½	....	4⅜x5¾	34x3½k	34x6k	W
Armleder..HW-B	2½	....	4¾x5½	36x4k	38x7k	W
Armleder..HW-C	2½	....	4½x5¼	36x4k	36x7k	W
Armleder..KW-B	3½	....	4⅝x6	36x5k	36x5dk	W
Armleder..KW-C	3½	....	4½x5½	36x5k	36x5dk	W
Atlas...MD	1	1185	3½x5	32x4½n	32x4½n	W
Atterbury...20R	1½	2475	3¾x5	34x3½	34x5	W
Atterbury...7CX	2½	3175	4¼x5¼	36x4	36x4d	W
Atterbury...22C	2½	3375	4½x5¼	36x4	36x4d	W
Atterbury...7D	3½	3975	4¼x5½	36x5	40x5d	W
Atterbury...22D	3½	4275	4½x5½	36x5	40x5d	W
Atterbury...8E	5	4975	4⅝x6	36x5	40x6d	W
Autocar...21UF	1½-c	1950	4¾x4½t	34x1k	34x5k	D
Autocar...21UG	1½-2	2050	4¾x4½t	34x1k	34x5k	D
Autocar...27H	2	2950	4 x5½	34x5	36x7	D
Autocar...27K2	2	3075	4 x5½	34x5	36x7k	D
Autocar...26Y	5	3950	4¼x5½	34x6	36x12	D
Autocar...26-B	5	4100	4¼x5½	34x6	36x12	D
Available...H1½	1½	2475	4 x5	36x3½k	36x5k	W
Available...H2	2	2775	4 x5	36x3½k	36x6k	W
Available...H2½	2½	3160	4 x5	36x4k	36x8k	W
Available...H3½	3½	4175	4½x5½	36x5	40x5d	W
Available...H5	5	5375	5 x6	36x6	40x12	W
*Avery	1	....	3 x4a	34x5n	34x5n	1
Beck...A Jr.	1¼	1285a	3½x5	34x4½n	34x4½n	1
Beck...B-30	1½	1725	3¾x5	34x5	36x6	
Beck...C-40	2	1810	3¾x5	36x6	36x6	
Beck...D-50	2½	2395	4¼x5¼	38x7	40x8	
*Bell...(Penn.)	½	1000b	3½x5	31x4n	31x4n	B
Bell...M (Iowa)	1	1495	3⅝x5½	35x5	35x5n	W
Bell...E (Iowa)	1½	2100	3¾x5½	34x3½	34x5	I
Bell...O (Iowa)	2½	2550	4½x5½	34x4	34x6	I
Belmont	½	725	3¾x4½	31x4	31x4	B
Belmont...D	2	2575	4¼x5½	34x3½k	34x6k	I
Belmont...F	3	3500	4 x6	36x5k	36x5dk	I
Bessemer...G	1	....	3½x5	35x5n	35x5n	I
Bessemer...H-2	1½	....	3¾x5	36x3½	36x5	I
Bessemer...J-2	2½	....	4½x5½	36x4	36x4d	I
Bessemer...K-2	4	....	4½x5½	36x5	36x10	I
Bethlehem...KN	1	1195	3½x5	35x5n	35x5n	B
Bethlehem...CN	2	1595	4 x6¼	34x4½k	34x6k	I
Bethlehem...HN	3	2195	4 x5¼	36x4k	36x8k	I
Brinton...C	1½	1500	3¾x5	34x4	34x5	W
Brinton...D	2½	2250	4½x5¼*	36x4	36x7	W
Brockway...E	1	....	3¾x5½	35x5n	35x5n	B
Brockway...S-5	1½	....	3¾x5	36x4	36x6	W
Brockway...SK	1½	....	4½x5¼	36x4	36x6	W
Brockway...KR	2½	....	4½x5½	36x4	36x8	W
Brockway...K-5	2½	....	4½x5¼	36x4	36x8	W
Brockway...RT	3½	....	4¾x6	36x5	36x10	W
Brockway...R-4	3½	....	4½x5½	36x5	36x5d	W
Brockway...T-4	5	....	4¾x6	36x6	40x6d	W
*Buick	½	945b	3¾x4¾	31x4n	31x4n	B
Capitol...G	1½	2075	3¾x5	35x5	38x7	W
Capitol...H2	2½	3700	4¼x6	36x4	36x8	W
Capitol...K2	2½	4250	4¼x6	36x6	42x9	W
Capitol...M3½	3½	4425	4½x6	36x5	36x10	W
Case	2	....	4¼x5¾	36x6	38x7	1
*Chevrolet	¼	510b	3¼x4	30x3½n	30x3½n	B
*Chevrolet...G	¾	650	3¼x4	31x4n	34x4½n	B
*Chevrolet...T	1	1095	3¼x5¼	33x4n	35x5n	W
Chicago...C1½	1½	....	4 x5	36x3½k	36x5k	W
Chicago...C2½	2½	....	4 x5	36x4k	36x7k	W
Chicago...C3½	3½	....	4½x5½	36x5	36x10	W
Chicago...D5	5	....	4½x5½	36x6	40x12	W
Clydesdale...10	¾-1½	1485	3¾x5	34x5n	34x5n	B
Clydesdale...18	¾-1½	1890	3¾x5	34x5	34x5	W
Clydesdale...20	1-1½	2385	3¾x5	34x5	34x5k	W
Clydesdale...42	1½-2	2475	3¾x5	36x3½	36x6	W
Clydesdale...65X	2½-3	3250	4½x5¼	36x4	36x8	W
Clydesdale..65EX	2½-3	3450	4½x5½	36x4	36x8	W
Clydesdale...90	3½-4½	4100	4½x5½	36x5	36x10	W
Clydesdale...120	5-6	4500	4¾x6	36x6	40x12	W
Columbia...H	1½	1995	4 x5	35x5	38x7n	1
Columbia...G	2½	2335	4 x5¼	36x4	36x7	1
Comet...T	1½	1950	3¾x5	34x4	34x4	W
Commerce...T	¾-1½	1450	3¾x5	34x4½n	34x4½n	B
Commerce...12	1½	1800	3¾x5	35x5n	35x5n	1
Commerce...16	2	2150	3¾x5	35x5n	36x6n	1
Commerce...18	2½	2495	4½x5¼	36x6n	40x8n	1
Commerce...25	2½	2425	4½x5¼	36x4	36x7	W
Cook...51	2½	3600	4 x5½	36x6n	40x8n	W
Corbitt...E-22	1	1480	3¾x5	34x3½	34x4	W
Corbitt...D-22	1½	$2200	3¾x5	34x3½	34x5	W
Corbitt...C-22	2	2600	4½x5¼	36x3½	36x7	W
Corbitt...B-22	2½	3000	4½x5¼	36x4	36x7	W
Corbitt...R-22	3	3200	4½x5½	36x4	36x8	W
Corbitt...A-22	3½-4	3800	4½x5½	36x5	36x10	W
Corbitt...AA-22	5	4500	4¾x6	36x6	40x6d	W
Day-Elder...AS	1	1600	3¾x5	35x5n	35x5n	W
Day-Elder...B	1½	2000	3¾x5	34x3½	34x5	W
Day-Elder...D	2	2400	4¼x5¼	36x4	36x7	W
Day-Elder...C	2½	2750	4¼x5½	36x4	36x7	W
Day-Elder...F	3½	3150	4½x5½	36x5	36x5d	W
Day-Elder...E	5	4250	4½x6	36x5k	40x6dk	W
Dearborn...E	1	1600	3⅝x5½	35x5n	35x5n	W
Dearborn...FX	1½	2300	3¾x5½	34x4	34x5	W
Dearborn...F	1½	2180	3¾x5½	34x4	34x5	W
Dearborn...48	2	2590	3¾x5½	34x4½n	34x7	W
Defiance...G	1	1695a	3¾x5	35x5n	35x5n	B
Defiance...D	1½	2095a	3¾x5	35x5n	36x6n	1
Defiance...E	2	2275a	3¾x5	35x5n	38x7n	1
Denby...31	1¼	1485	3½x5	35x5n	35x5n	B
Denby...33	1½	2145	3¾x5	35x5n	38x7n	1
Denby...34	2	2395	3¾x5	30x3½	36x6	1
Denby...35	2½-3	2795	4½x5¼	36x4	36x7	1
Denby...27	4	3895	4½x5½	36x5	36x5d	1
Denby...210	5	4295	4½x5½	36x6	40x6d	1
Dependable...A	¾-1	1650	3⅝x5½	34x5n	36x6n	W
Dependable...C	2	2350	3¾x5½	34x3½	34x5	W
Dependable...D	2½	2650	4 x5½	34x5	36x6	W
Dependable...E	3	2950	4¼x5½	36x4	36x7	W
Diamond T...O-3	1-1¼	1975	3¾x5½	36x3½n	36x4n	W
Diamond T...T	1½	2250	3¾x5½	36x3½	36x5	W
Diamond T...U	2-2½	2650	4 x5½	36x4	36x7	W
Diamond T...K	3½	3750	4¼x5½	36x5	36x5d	W
Diamond T...EL	5	4325	4½x5½	36x6	40x6d	W
Diamond T...S	5	4500	4¾x6	36x6	40x6d	W
*Diehl...A	1	....	3½x5	34x4½	35x5	1
Diehl...B	1½	....	3½x5	36x6	36x6	1
Doane	2½	4100b	4¼x5¾	36x5	36x7	C
Doane	3½	5100b	4⅝x5¾	36x5	36x5d	C
Doane	6	6000b	5 x6¼	36x6	40x6d	C
*Dodge Brothers	¾	730	3¾x4½	32x4n	32x4n	B
Dorris...K-4	2-2½	3400	4¼x5½	36xf	36x7	W
Dorris...K-7	3½	4400	4¼x5½	36x5	36x10	W
*Dort...103	½	685a	3½x5	31x4n	31x4n	B
Double Drive...B	3	4000	4¼x5½	6	6	W
Duplex...A	2	2775	4 x5½	35x5n	38x7n	W
Duplex...E	3½	3500	4¼x5½	36x8	36x8	1
Duty...22	2	1590	3½x5	34x3½	34x5	1
Eagle...101	1½	1875	3⅝x5½	34x5	34x5	1
Eagle...100-2	2	2275	3¾x5¼	34x4k	34x7k	1
F. W. D...B	3	4200	4¾x5½	36x6	36x6	B
Fageol...1½	1½	3000	3¾x5¼	34x3½k	34x6k	W
Fageol...2½	2½	3900	4¼x5¾	34x4	36x7	W
Fageol...3½	3½	5000	4½x6¼	36x5k	40x5dk	W
Fageol...5	5	5700	4½x6¼	36x6	40x6d	W
Fargo...R	2	1700	3¾x5	30x4	36x6	1
*Federal	1½	1375	3¾x5	—x5n	—x5n	
Federal...SD	1½	1800	3¾x5	35x5n	36x6n	W
Federal...TE	1½	2175	4¼x5¼	36x3½	36x5	W
Federal...UE	2-2½	2425	4¼x5¼	36x4	36x7	W
Federal...WE	3½-4	3150	4¼x5½	36x5	36x5d	W
Federal...X2	5-6	4500	4¾x6	36x6	40x6d	W
*Ford...TT	1	430	3¾x4	30x3½n	32x4½n	W
Front Drive...C	1½	2800	3¾x5½	5	4	W
G & J**...20	1	2275	3⅝x5½	34x5n	34x5n	W
G & J**...A	2-2½	3375	4x5¼	36x4	36x7	W
G & J**...B	3½-4	4475	4½x5½	36x5	36x10	W
G.M.C...K16	1	1295	3½x5½	34x5n	34x5n	B
G.M.C...K-41A	2	2375	4 x5½	36x4k	36x7k	W
G.M.C...K-41B	2	2375	4 x5½	36x4k	36x7k	W
G.M.C...K41-T	2	2450	4x5½	36x4	36x8	W
G.M.C...K-71A	3½	3600	4½x6	36x5	40x5d	W
G.M.C...K-71B	3½	3700	4½x6	36x5	40x5d	W
G.M.C...K71-T	3½	3700	4½x6	36x5	40x12	W
G.M.C...K-101A	5	3950	4½x6	36x5	40x6d	W
G.M.C...K101-T	5	4050	4½x6	36x5	40x14	W
G.M.C...K-101B	5	4050	4½x6	36x5	40x6d	W
G.W.W	1½	1850	3¾x5½	35x5	35x5	1
*Garford	1	1590	3⅝x5½	34x5n	34x5n	W
Garford...25-B	1½	1990	3¾x5½	36x3½	36x5	W
Garford...70-H	2½	2750	4¼x5½	36x4	36x8	W
Garford...77-D	4	3750	4½x6	36x5	36x5d	W
Garford...68D	5	4500	5 x6½	36x6	40x6d	W
Garford...150-A	7½	5200	5 x6½	36x6	40x7d	C
Gary...F	1-1½	1675	3¾x5	36x3½	36x5	W
Gary...I	2	2250	4 x5½	36x3½	36x6	W
Gary...J	2½	2650	4¼x5½	36x4	36x8	W
Gary...K	3½	3650	4½x6	36x5	40x5d	W
Gary...M	5	4100	5 x6½	36x6	40x6d	W
Gersix...M	1½	3100	4 x5½	36x3½	36x7	W
Gersix...K	2½	3500	4½x5½	36x4	36x8	W
Gersix...3½		$4500	4½x6	36x5	40x12	W
Graham Bros...1		1265	3¾x4½	33x4½n	34x5n	B
Graham Bros...1½		1325	3¾x4½	33x4½n	36x6n	B
[1]Gramm-Pion...10	1	1245	3½x5	33x5n	33x5n	B
[1]Gramm-Pion...15	1½	1750a	3¾x5	36x3½k	36x5k	1
[1]Gramm-Pion...65	1½	2250a	3¾x5	36x3½k	36x5	W
[1]Gramm-Pion...20	2	2475a	4½x5¼	36x4k	36x7k	W
[1]Gramm-Pion...30	3	3300a	4¼x5½	36x4k	36x4dk	W
[1]Gramm-Pion.75P	3½	4225a	4½x5½	36x6n	42x9n	W
[1]Gramm-Pion...40	4	3850a	4½x5½	36x5	36x5dk	W
[1]Gramm-Pion...50	5-6	4450a	4¾x6	36x6	40x6dk	W
Hahn...B2	1	1750	3½x5	34x5k	34x5k	W
Hahn...O	1½	2150	3¾x5¼	36x3½k	36x6k	W
Hahn...K	2	2550	4½x5½	36x4k	36x7k	W
Hahn...L	3	3350	4½x5½	36x5k	36x8k	W
Hahn...M	5	3850	4½x5½	36x6	36x10	W
Hahn...N	6	4250	4¾x6	36x6	40x12	W
Hal-Fur...E	1½	2350	4x5½	34x5n	38x7n	W
Hal-Fur...B	2½	3000	4¼x5½	36x6n	36x8	W
Hal-Fur...F	3½	4000	4½x5½	36x6n	40x10	W
Hall...1½	1½	3100	3¾x5	34x5n	38x7n	W
Hall...2½	2½	3275	4¼x5¼	36x4	36x6	W
Hall...3½	3½	4100	4½x5½	36x5	36x5d	W
Hall...5	5	5100	4½x5½	36x5	40x6d	W
Hall...7 chain	7	5100	4½x5½	36x5	40x6d	C
Harvey...WOA	2	2650	4¼x5½	34x4	34x7	W
Harvey...WFA	2½	2950	4¼x5½	36x4	36x7	W
Harvey...WHA	3½	3950	4½x6	36x5	36x5d	W
Hawkeye...K	1½	1850	3¾x5½	34x3½k	34x5k	1
Hawkeye...M	2	2650	4¼x5	36x4k	36x6k	I
Hawkeye...N	3½	3700	4½x6⅜	36x5k	36x10k	I
Hendrickson...O	1½	2200	3¾x5⅛	36x4n	36x5n	W
Hendrickson...N	2½	2690	4¼x5¾	36x4k	36x7k	W
Hendrickson...M	3½	3000	4¼x5	36x5k	36x5dk	W
Hendrickson...K	5	4000	5 x6¾	36x6	40x6	W
Huffman...B	1½-2	1795	3¾x5	34x3½	34x6	W
Huffman...C	1½-2	1695	3¾x5½	36x3½	36x6	I
Huffman...D	2-3	2895	4¼x5½	36x4	36x7	
Hurlburt...A-A	1-1½	1950	3¾x5	34x5n	34x5n	W
Hurlburt...B-B	2-2½	2800	4¼x5½	36x4	36x4d	W
Hurlburt...C-C	3-3½	3475	4¼x5½	36x5	36x5d	W
Hurlburt...D-D	4-4½	4150	4½x6	36x5	36x6d	W
Hurlburt...E-E	6-6½	4850	4¾x6½	36x6	40x6d	W
Indep'd't(Iowa), B	1	1665	3½x5	34x3½	34x4	1
Indep'd't(Iowa), G	1½	2040	3¾x5¼	34x3½	34x5	1
Indep'd't(Ia.), HI	2½	2040	4½x5¼	36x4	36x7	1
Indep'd't(Ohio), F	1½	2385	3¾x5	36x3½	36x5	W
Indep'd't(Ohio) H	2½	3085	4½x5¼	36x4	36x4d	W
Indep'd't(Ohio) K	3½	3985	4½x5½	36x5	36x5d	W
Indiana...12	1½-2	....	3¾x5¼	34x3½k	34x5k	W
Indiana...20	2	....	4½x5½	36x4k	36x7k	W
Indiana...25	2½-3	....	4½x5½	36x4k	36x8k	W
Indiana...35	3½-4	....	4⅝x5½	36x5k	36x5dk	W
Indiana...51	5-7	....	5 x6¼	36x5k	40x6dk	W
*International...S	1	1250	3½x5	34x5n	34x5n	1
International...21	1	1650	3½x5¼	36x3½	36x3½	1
International...31	1½	1650	3½x5¼	36x3½	36x4	1
International...41	2	2100	3½x5¼	36x3½	36x5	1
International...61	3	2400	4¼x5	36x4	36x6	1
International..101	5	3600	4¾x5	36x5	40x10	1
Jackson...4WD	3½	3850	4½x5½	36x7	36x7	B
Jumbo...15	1½	2295	3¾x5¼	36x3½	36x5	1
Jumbo...20	2	2520	3¾x5¼	35x5n	38x7n	1
Jumbo...25	2½	2660	4½x5½	36x4	36x7	1
Jumbo...30	3	3060	4¼x5½	36x6n	42x9n	1
Jumbo...35	3½	3900	4½x6	36x5	36x10n	1
Jumbo...40	4	4400	4½x6	38x7n	44x10	1
K-Z...1	1	1750	3½x5	34x3½	34x5	W
K-Z...1½	1½	2075	3¾x5	36x4	36x6	W
K-Z...2½	2½	2550	4½x5¼	36x4	36x8	W
K-Z...3½	3½	3350	4½x5½	36x5	40x10	W
K-Z...5	5	3850	4½x5½	36x6	40x6d	W
Kalamazoo...T	1	1295	4 x5	34x5	34x5n	B
Kalamazoo...G-1	1½	1800	3¾x5	34x4	34x5	W
Kalamazoo...LG	2	2645	4 x5	36x4	36x7	W
Kalamazoo...NH	3	3145	4 x6	36x5	36x10	W
Kalamazoo...HD	3	3350	4¼x6	36x5	36x10	W
Kalamazoo...SK	4	3845	4¼x6	36x5	36x12	W
Kalamazoo...6X	5	4350	4½x6	36x6	40x6d	W
*Kelly-S...K-31	1½	2700	3¾x5¼	36x3½	36x6	C
*Kelly-S...K-34	1½	2700	3¾x5¼	36x3½	36x6	W
*Kelly-S...K-38	2½	2900	3¾x5¼	36x4	36x4d	W
*Kelly-S...K-35	2½	2900	3¾x5¼	36x4	36x4d	C
*Kelly-S...K-40	3½	3900	4¼x6½	36x5	40x5d	C
*Kelly-S...K-41	3½	3900	4½x6½	36x5	36x10	I
*Kelly-S...K-42	3½	3900	4½x6½	36x5	40x5d	W
*Kelly-S...K-50	5	4400	4½x6¼	36x6	40x6d	C
*Kelly-S...K-60	6	4600	4½x6½	36x6	40x7d	C
*Kelly-S...K-61	5-7	4800	4½x6½	36x6	36x7d	I
Keystone...40	2	2175	3¾x5⅛	34x5n	38x7n	1
Kimball...AB	2	3675	4 x6	36x4	36x7	W
Kimball...AC	2½	3975	4¼x6	36x4	36x8	W
Kimball...AK	3	4500	4½x6	36x4	36x10	W
Kimball...AE	4	5000	4¾x6	36x5	40x12	W
Kimball...AF	5	5500	5 x6	36x6	40x7d	W
*Kissel...Express	1	1585	3⅞x5½	34x5n	34x5n	W
Kissel...Utility	1½	1975	3⅞x5½	36x3½	36x5	W
Kissel...Freighter	2½	2875	4¼x5½	36x4	36x7	W
Kissel...H. D.	4	3675	4¼x5½	36x5	36x5d	W
Kleiber...AA	1	2200	4½x5¼	34x3½k	34x5k	W
Kleiber...A	1½	3100	4½x5¼	36x3½k	36x6k	

FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm.
r—8 cyl. s—6 cyl. t—2 cyl.—all others are 4 cyl. d—dual tires. k—pneumatic tires optional at extra cost. n—pneumatic tires. a—price includes several items of equipment. b—price includes body. *—express truck or delivery wagon. **—Canadian Make. trac.—tractor.

1—Gramm-Pioneer. 2—Kelly-Springfield.

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Kleiber.....BB	2	$3600	4½x5¼	36x4k	36x7k	W
Kleiber.....B	2½	3950	4½x5½	36x5k	36x8	W
Kleiber.....C	3½	4600	4½x5½	36x5	36x5d	W
Kleiber.....D	5	5300	5 x6½	36x6	40x12	W
Koehler.....D	1½	2150	3½x5	34x3½	34x5	W
Koehler.....M	2½	3175	4 x5¼	36x4	36x7	W
Koehler.....MCS	2½	3275	4 x5¼	36x4	36x7	W
Koehler.....F	3½	4470	4½x5½	36x5	36x10	W
Koehler,MT. Trac	5	3275	4 x5⅛	36x4	36x7	W
Krebs.....23	¾	1260	3¾x5	34x4½	34x4½	B
Krebs.....24	1	1565	3¾x5	34x5	34x5	W
Krebs.....45	1½	2125	4½x5¼	36x4	36x7	W
Krebs.....75	2½	2375	4½x5½	36x4	36x8	W
Krebs.....110	3½	2975	4½x5½	36x5	40x10	W
Larrabee.....X-2	1½	1925	3½x4½	34x5n	34x5n	B
Larrabee.....U	1½	2400	3¾x5	34x3½	34x5	W
Larrabee.....	1½–2½	2400	3¾x5	34x3½k	34x5k	W
Larrabee.....K	2½–3	3100	4½x5¼	36x4	36x7	W
Larrabee.....K-5	2½–3½	3450	4½x5½	36x4	36x8	W
Larrabee.....L-4	3½–5	4000	4½x5½	36x5	36x5d	W
Larrabee.....W	5–7	4800	4¾x6	36x6	40x6d	W
Maccar.....L	1½	....	4½x5¼	36x4	36x6	W
Maccar.....H-A	2	....	4½x5¼	36x4	36x4d	W
Maccar.....H-2	3	....	4½x5½	36x4	36x5d	W
Maccar.....M-3	4	....	4½x5½	36x5	36x6d	W
Maccar.....G	5–6	....	4¾x6	36x5	40x6d	W
MacDonald.....A	7½	5750	4½x6	40x7	40x14	I
Mack...AB D.R.	1½	3150	4 x5	36x4	36x3½d	D
Mack...AB Chain	1½	3000	4 x5	36x4	36x3½d	C
Mack...AB Chain	2	3300	4 x5	36x4	36x4d	C
Mack...AB D.R.	2	3750	4 x5	36x4	36x4d	D
Mack...AB D.R.	2½	3850	4 x5	36x4	36x4d	D
Mack...AB Chain	2½	3400	4 x5	36x4	36x4d	C
Mack...AC Chain	3½	4950	5 x6	36x5	40x5d	C
Mack...AC Chain	5	5500	5 x6	36x6	40x6d	C
Mack...AC Chain	6½	5750	5 x6	36x6	40x12	C
Mack...AC Chain	7½	6000	5 x6	36x7	40x7d	C
Mack Trac...AB	5	3400	4 x5	36x4	36x4d	C
Mack Trac....AC	7	4950	5 x6	36x5	40x5d	C
Mack Trac....AC	10	5500	5 x6	36x6	40x6d	C
Mack Trac....AC	13	5750	5 x6	36x6	40x12	C
Mack Trac....AC	15	6000	5 x6	36x7	40x7d	C
*Mapleleaf.....	1½	3000	3¾x5½	34x5n	36x6n	W
Mapleleaf...AA**	2	3600	4 x5¼	36x4	36x7	W
Mapleleaf...BB**	3	4050	4¼x5½	36x4	36x4d	W
Mapleleaf...CC**	4	4800	4½x5½	36x5	36x5d	W
Mapleleaf...DD**	5	5625	4½x5½	36x6	40x6d	W
Master.....JW	1½	2290	4½x5½	34x3½	34x5	W
Master.....JD	1½	2590	4½x5½	34x3½	34x5	D
Master.....Z	2	2290	4½x5½	34x3½	34x5	W
Master.....W	2½	2800	4¼x5½	34x4	36x7	W
Master.....DD	2½	3190	4¼x5½	34x4	36x7	D
Master.....A	3½	3990	4½x6	36x5	40x5d	W
Master.....E	3½	4290	4½x6	36x5	40x5d	D
Master.....V	4	4490	4½x6	36x5	40x6d	W
Master.....B	5	4990	4¾x6½	36x6	40x6d	W
Master.....F	5	5090	4¾x6½	36x6	40x6d	D
MasterTrac.,DDT	6	3390	4¼x5½	34x4	36x7	D
*Maxwell.....	1½	932	3½x4½	32x3n	32x4n	W
*Menominee.....	1	1650	4 x5	34x5n	34x5n	W
Menominee...HT	1–1¼	2000	3¾x5	34x3½	36x5	W
Menominee...H	1½	2475	4 x5	36x3½	36x5	W
Menominee...D	2–2½	2875	4 x6	36x4	36x8	W
Menominee...G	3½	3800	4½x6	36x5	36x10	W
Menominee...J-3	5	4250	4¾x6	36x6	40x12	W
Moline.....10	1½	1985	3½x5	34x5n	36x6n	I
³Moreland..R. R.	1	1595	4 x5	34x5n	34x5n	B
Moreland.....BX	1½	1980	4 x5	36x3½	36x6k	W
Moreland.....EX	2	2800	4½x5¼	36x4	36x7k	W
Moreland.....AX	3	3500	4½x5½	36x5	36x10k	W
Moreland.....RX	4½–5	4600	4¾x6	36x6	40x6	W
Nash.....2018	1–1½	1595	3¾x5¼	34x3k	34x4k	I
Nash.....3018	2–2½	2150	3¾x5¼	34x4k	34x7k	I
Nash.....Quad.	2–2½	2750	4¼x5½	36x5k	36x5k	I
Nash. 3018, LWB	2–2½	2200	3¾x5¾	34x4k	34x7k	I
Nash. Quad. LWB	2–2½	2800	4¼x5½	36x5k	36x5k	I
Nash.....5018	2½	2250	3¾x5¼	34x4k	34x7k	I
⁴Nelson.....G2	1½	....	4½x5¼	36x3½	36x6	W
⁴Nelson.....G3	2½	....	4½x5¼	36x4	36x7	W
⁴Nelson.....G4	3½	....	4½x5½	36x5	36x5d	W
⁴Nelson.....G5	5	....	4¾x6	36x6	40x6d	W
Netco.....DK	2	3100	4½x5¼	36x4k	36x7k	W
Netco.....HL	2½	3500	4½x5½	36x4k	36x8k	W
Niles.....E	2	3000	4½x5¼	36x4k	36x7k	W
Noble.....A21	1¼	1840	3½x5½	34x5	34x5	W
Noble.....B31	1½–2	2480	3¾x5¼	36x4	36x7	W
Noble.....D51	2½–3	2950	4¼x5½	36x4	36x8	W
Noble.....E71	3½–5	3800	4½x6	36x5	36x10	W
Noble.....B30	1½	....	3¾x5¼	36x3½	36x5	W
Noble.....C40	2	....	4 x5½	36x4	36x7	W
Noble.....D50	2½	....	4¼x5½	36x4	36x8	W
Noble.....E70	3½	....	4½x6	36x5	36x10	W
Northwestern..W	1½	2700	4½x5¼	34x4	36x6	W
Northwestern.WS	2½	3500	4½x5½	36x4	36x8	W
Norwalk.....25E	1	1595	3½x5	34x3½	34x4	W
Norwalk.....35E	1½	1925	3½x5	34x3½	34x3½d	W
Norwalk,35E.Spec	1½	2285	3¾x5¼	34x3½	34x5	W
Ogden.....A2	1	....	3½x5	34x5n	34x5n	W
Ogden.....D	1½	....	3¾x5	36x3½	36x5	W
Ogden.....E	2½	....	4½x5¼	36x4	36x8	W
Old Hickory...W	1	$1775	3¾x5	36x3½k	36x4k	W
Old Reliable....A	1½	2350	4 x5	34x4	36x6	W
Old Reliable....B	2½	3500	4¼x6	34x4	36x4d	W
Old Reliable....C	3½	4250	4½x6	36x5	36x5d	W
Old Reliable....D	5	5000	4¾x6	36x6	40x6d	W
Old ReliableKLM	7	6000	4¾x6½	36x6	40x7d	C
*Oldsmobile Econ	1	1095	3½x5¼	35x5n	35x5n	I
Olympic.....A	2½	3200	4¼x5½	36x4	36x8	W
Oneida.....B9	1½	2825	4 x5¼	36x3½	36x7	
Oneida.....C9	2½	3200	4 x5¼	36x4	36x8	
Oneida.....D9	3½	4050	4½x5½	36x5	36x10	
Oneida.....E9	5	4725	4½x5½	36x6	40x12	
Oshkosh.....A	2	3250	3½x5	36x6n	36x6n	B
Oshkosh.....AA	2	3400	3½x5	36x6n	36x6n	B
Oshkosh.....B	2½	3850	4 x5½	38x7n	38x7n	B
Oshkosh.....BB	2½	4000	4 x5½	38x7n	38x7n	B
*Overland.....4	½	450	3½x4	30x3½n	30x3½n	B
Packard.....EC	2–3	3100	4¼x5½	36x4	36x7	W
Packard.....EX	2–2½	3100	4¼x5½	36x6n	40x8n	W
Packard.....ED	3½–4½	4100	4½x5½	36x5	36x5d	W
Packard.....EF	5–7½	4500	5 x5½	36x6	40x6d	W
Paige.....52-19	1½	1950	4 x5¼	34x3½	34x5	W
Paige.....54-20	2½	2420	4¼x5½	34x4	34x8	W
Paige.....51-18	3½	3145	4½x5½	36x5	36x5d	W
Parker.....C-22	1	1875	3¾x5¼	34x5n	34x5n	W
Parker.....G-22	2½	3200	4¼x6	34x4	36x4d	W
Parker.....J-20	3½	3950	4½x6	36x5	40x5d	W
Parker.....M-20	5	4850	5 x6	36x6	40x6d	W
Patriot....Revere	1	1380	3¾x5	35x5n	35x5n	W
Patriot....Lincoln	2	2050	4 x5¼	34x3½	34x5	W
Patriot .Washgt'n	3	2900	4½x5½	36x4	36x7	W
Pierce-Arrow.....	2	3200	4 x5½	36x4	36x4d	W
Pierce-Arrow.....	3½	4350	4½x6¾	36x5	36x5d	W
Pierce-Arrow.....	5	4850	4½x6¾	36x5	40x6d	W
Pittsburgher.....	1½–2	3000	3¾x5	36x4	36x6	..
Pittsburgher.....	3	3800	4½x5¼	36x5k	36x8	W
Power.....F	2	3150	3¾x5¼	36x5	36x7	W
Power.....C	3½	4250	4¼x5½	36x5	40x10	W
Premocar...B-143	1½	2475	3½x5	36x6n	36x6n	W
*Rainier.....R-21	¾	....	3½x5	35x5n	35x5n	W
Rainier.....R-29	1	....	3¾x5	34x3½	34x4	W
Rainier.....R-26	1½	....	3¾x5	34x3½	34x5	W
Rainier.....R-28	2	....	4½x5¼	34x4	34x6	W
Rainier.....R-20	2½–3	....	4½x5¼	34x4	34x7	W
Rainier.....R-15	3½–5	....	4½x5½	36x5	36x5d	W
Rainier.....R-17	5–6	....	4¾x6	36x6	40x6d	W
Ranger..TK-20-2	1½	2450	3¾x5	36x6n	38x7n	W
*Reo.....F	¾–1¼	1245	4½x4½	34x4½n	34x4½n	B
Reliance.....10A	1½	2400	4 x5½	36x3½	36x5	I
Reliance.....20B	2½	3100	4½x5½	36x4	36x4d	I
Republic.....75	¾	1305b	3½x5	32x4½n	32x4½n	I
Republic.....10	1	1395	3¾x5	34x3	34x4	I
Republic..10 Exp	1	1695	3¾x5	34x5n	34x5n	I
Republic.....11X	1½	1795	3¾x5	34x4	34x6	I
Republic.....19	2½	2195	4½x5¼	36x4	36x7	I
Republic.....20	3½	3095	4½x5½	36x5	36x10	I
Rowe.....CW	1½	3000	3¾x5	36x6n	36x6n	W
Rowe....C.D.W.	2	3300	4 x5	34x4	36x3½d	W
Rowe....G.S.W.	3	4150	4 x6	34x5	36x5d	W
Rowe....G.P.W.	3	5250	3½x5r	38x7n	42x9n	W
Rowe.....HW	4	4500	4¼x6	36x5	36x6d	W
Rowe.....F. W.	5	5500	4½x6	36x6	40x6d	W
Ruggles.....20	1	1195	3¾x5	34x5n	34x5n	B
Ruggles.....40	2	1795	4 x5	34x5n	34x7	D
Samson.....15	¾	....	4–3½x4	32x4n	32x4n	B
Samson.....25	1¼	....	4–3½x5½	35x5n	35x5n	B
Sanford.....W-15	1½–2	2150b	3¾x5	36x3½k	36x5k	..
Sanford.....25	2½–3½	....	4½x5¼	36x4	36x4d	W
Sanford.....35	3½–5	....	4½x5½	36x5	36x5d	W
Sanford.....50	5–7	....	4¾x6	36x5	40x6d	W
Schacht....2-Ton	2	3200	4½x5½	36x4	36x7	W
Schacht....3-Ton	3	3800	4½x5½	36x5	36x5d	W
Schacht....4-Ton	4	4200	4½x6	36x5	40x5d	W
Schacht....5-Ton	5	4400	4½x6	36x5	40x6d	W
Schacht....7-Ton	7	5050	4½x6	36x6	40x7d	W
Schwartz.....A	1	1685	3½x5	34x4½n	34x4½n	B
Schwartz.....K	2	3000	3¾x5¼	34x3½	34x7	W
Schwartz.....L	3	3600	4¼x5½	36x4	36x8	W
Schwartz.....M	5	4900	4½x6	36x6	40x12	W
Selden.....30	1½–2½	2250	3¾x5	34x3½	34x5	W
Selden.....31	1½–2½	3350	4½x5¼	34x5n	38x7n	W
Selden.....50	2½–3½	3250	4¼x6	36x4	36x7	W
Selden.....51	2½–3½	4350	4½x5½	36x6n	40x8n	W
Selden.....70	3½–5	3750	4½x5½	36x5	36x10	W
Selden.....90	5–7	4950	4¾x6	36x6	40x12	W
Seneca.....M	½	820	3½x4½	30x3½n	30x3½n	B
*Service.....12	¾	....	3½x4½	32x4½n	32x4½n	B
*Service.....15	1¼	....	3½x5	34x4½n	35x5n	B
Service.....21	1½	....	3½x5½	34x3½	34x5	W
Service.....32	2	....	4 x5½	36x3½	36x7	W
Service.....37	2	.....	4¼x5½	35x5n	38x7n	W
Service.....52	3	.....	4¼x5½	36x4	36x8	W
Service.....72	3½	.....	4¼x5½	36x5	36x5d	W
Service.....77	4	.....	4½x6	36x5	36x5d	W
Service.....102	6	.....	4½x6	36x6	40x6d	W
Signal.....NF	1	$1450	3¾x5	34x5n	36x6n	W
Signal.....H	1½	1950	4¼x5¼	34x4	36x6	W
Signal.....J	2½	2375	4¼x5¼	34x4	36x8	W
Signal.....M	3½	3175	4½x5½	36x5	40x5d	W
Signal.....R	5	3900	4¾x6	36x6	40x6d	W
Southern.....10	1	2090	3¾x5	34x3½	34x4	W
Southern.....15	1½	2590	3¾x5½	36x6n	34x4	W
Southern.....20	2	2990	4¼x5¼	36x6n	40x8k	W
*Standard.....75	1¼	1330	3¾x5	33x5n	33x5n	W
Standard.....1-K	1½	1600	3¾x5	34x3½k	34x5k	W
Standard.....76	2½–3	2400	4½x5¼	36x4k	36x7k	W
Standard.....66	3½–5	3150	4½x5½	36x5	36x10	W
Standard.....5-K	5–7	4400	4¾x6	36x6	40x12	W
*Star.....	½	610b	3½x4¼	30x3½n	30x3½n	B
Sterling.....1½	1½	2885	4 x5¼	36x3½k	36x5k	W
Sterling.....2	2	3085	4 x5¼	36x4k	36x6k	W
Sterling.....2½	2½	3290	4½x5¼	36x4k	36x4dk	W
Sterling.....3½	3½	4325	4½x6¼	36x5k	40x5dk	W
Sterling.....5-W	5	4950	5 x6¼	36x6	40x6d	W
Sterling.....5-C	5	5500	5 x6¼	36x6	40x6d	C
Sterling.....7½	7½	6000	5 x6¼	36x6	40x7d	C
*Stewart.....14	1¼	1245	3½x5½	34x4½n	34x4½n	I
Stewart.....15	1½–1¾	1445	3½x5½	35x5n	35x5n	I
Stewart.....9	1½–2	1790	3¾x5	34x3½	34x5	I
Stewart.....7	2–2½	2190	4½x5¼	34x4	34x7	I
Stewart.....7-X	2½–3	2390	4¼x5½	34x4	34x7	I
Stewart.....10	3½–4	3190	4½x5½	36x5	36x5d	I
Stewart.....10-X	3½–4	3190	4½x6	36x5	36x5d	I
*Stewart.....	1¼	1245	4–3½x5½	34x4½	34x4½	
*Stoughton.....C	¾	1240	3½x5	34x4½n	34x4½n	W
Stoughton.....A	1	1790	3¾x5¼	34x5	34x5	W
Stoughton.....B	1½	2150	3¾x5¼	36x3½	36x5	W
Stoughton.....D	2	2490	4 x5½	36x4	36x7	W
Stoughton.....F	3	3150	4¼x5½	36x5d	36x5d	W
Sullivan.....E	2	2800	4¼x5½	36x4k	36x7k	W
Sullivan.....H	3½	3750	4½x6	36x5	36x5d	W
*Thomart.....	1¼	1795a	4 x5¼	34x5	34x5	C
Tiffin.....GW	1½	2100	4½x5¼	36x3½	36x5	W
Tiffin.....MW	2½	2700	4½x5¼	36x4	36x3½d	W
Tiffin.....PW	3½	3600	4½x5½	36x5	40x5d	W
Tiffin.....PW	5	4300	4½x6	36x6	40x6d	W
Tiffin.....UW	6	4500	4¾x6	36x6	40x12	W
Titan.....	2	2750	4 x5	36x4k	36x7k	D
Titan.....	2½	2950	4¼x5¾	36x4k	36x8k	D
Titan.....	3½	3950	4½x6	36x5k	40x10k	D
Titan.....	5	4550	4½x6	36x5	40x12	D
Tower.....J	1½	2000a	4½x5¼	35x5n	38x7n	W
Tower.....H	2½	2475a	4½x5¼	36x4	36x7	W
Tower.....G	3½	3475a	4½x5½	36x5	36x5d	W
Traffic.....	1½	1595	3¾x5	35x5n	35x5n	I
Traffic.....C	2	1595	3¾x5	34x3½k	34x5k	I
Traffic.....	3	1895a	3¾x5	36x4	36x7	I
*Transport.....15	1	1295	3¾x5	32x4½n	32x4½n	B
Transport.....25	1½	1495	3¾x5½	34x3½k	34x4k	I
Transport.....35	2	1885	3¾x5	36x3½k	36x6k	I
Transport.....55	3	2385	4¼x5¼	36x4k	36x8k	I
Transport.....60	3½	2585	4¼x5½	36x4k	36x8k	I
Transport.....75	5	3485	4½x6	36x5k	36x12k	I
Traylor.....B	1½	2390	3¾x5½	34x3½	34x5	W
Traylor.....C	2–2½	2850	4 x5½	36x4	36x7	W
Traylor.....D	3–3½	2300	4¼x5½	36x4	36x8k	W
Traylor.....F	5–6	4700	4½x6	36x6	40x6d	W
*Triangle.....AA	1	1285	3¼x5	34x4½n	34x4½n	I
Triangle.....A	1½–2	1985	3¾x5¼	34x3½k	34x6k	I
Triangle.....C	2–2½	2285	3¾x5¼	36x4k	36x7k	I
Triangle.....B	2½–3	2585	4 x5¾	36x4k	36x7k	I
Twin City...B.W.	2	2750	4 x5½	36x6	40x8	I
Twin City...AW.	3½	3950	4½x6	36x5	40x5d	W
⁵Twin City.....B	3½	....	5½x6	36x6	36x6	I
⁵Twin City.....A	5	....	5½x6	36x7	36x7	I
Ultimate.....A	2	3150	4 x5½	36x3½	36x6	W
Ultimate.....AJ	2	3200	4½x5½	36x3½	36x6	W
Ultimate.....AJL	2	3250	4½x5½	36x3½	36x6	W
Ultimate.....B	3	3700	4½x5½	36x4	36x4d	W
Ultimate.....BL	3	3800	4½x5½	36x4	36x4d	W
Ultimate.....D	5	5500	5 x6½	36x6	40x12	W
Union.....FW	2½	3490	4 x6	36x5k	36x8k	D
Union.....HW	4	4650	4½x6	36x6	40x12	D
United.....A	1½	2445	3¾x5¼	36x3½k	34x5k	W
United.....B	2½	3150	4¼x5½	36x4k	36x7k	W
United.....C	3½	3975	4½x5½	36x5	36x5d	W
United.....V	5	4503	4½x6	36x6	40x6d	W
*United States..U	1	1875	3½x5½	34x5n	34x5n	B
UnitedStates,NW	1½	2225	3¾x5	36x5	36x3½	W
United States...N	1½	1975	3¾x5	36x3½k	30x5k	1
United States...R	3	3075	4 x5¼	36x4	36x4d	W
United States...S	4	3875	4½x5½	36x5	36x5d	W
United States...T	6	4850	4¾x6½	36x6	40x6d	W
Velie.....46	1½	1585	3¾x5	36x3½k	36x5k	I
Veteran.....M**	1½	2699	3¾x5¼	35x5n	35x5n	W
Veteran.....P**	2	3699	4¼x5½	36x4	36x7	W
Veteran.....R**	3	4200	4¼x5½	36x4	36x7	W
Veteran.....S**	4	5395	4½x6	36x5	36x10	W
*Vim.....29	½	1050	3½x4½	31x4n	31x4n	W

FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm. r—8 cyl. s—6 cyl. t—2 cyl.—all others are 4 cyl. d—dual tires. k—pneumatic tires optional at extra cost. n—pneumatic tires. a—price includes several items of equipment. b—price includes body. *—express, truck or delivery wagon. **—Canadian Make. trac.—tractor.

3—Moreland Road Runner. 4—Nelson Le Moon. 5—Twin City Four Wheel Drive.

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Vim.....30	1½	$1175	3¼x4½	32x4½	32x4½	W
Vim.....31	1	1975	3¾x5⅛	35x5n	35x5n	W
Vim.....22	2	3150	3¾x5⅛	36x4	36x6	W
Vim.....23	3	3950	4¼x5½	36x5	36x5d	W
Walker-JohnsonA	2	2250	3¾x5	34x3½	34x6	W
Walker-JohnsonB	3	2750	4¼x5¼	36x4	36x8	W
Walter.....M	2½	3850	4½x5¾	36x4	36x8	D
Walter.....S	5	4850	4½x6¼	36x6	40x6d	W
*Watson.....C	1	1465a	3⅝x5½	35x5n	35x5n	W
Watson.....N	3½	4250	4½x5½	36x5	36x10	W
Western....W1½	1½	2550	4½x5¼	36x3½k	36x5k	W
Western....L1½	1½	2550	3¾x5	36x3½k	36x5k	W
Western....W2½	2½	3250	4½x5¼	36x4	36x7	W
Western....L2½	2½	3250	4¼x6	36x4	36x7	W
Western....W3½	3½	4250	4½x6	36x5	40x5d	W
*White.....15	¾	2400	3¾x5½	34x5n	34x5n	B
White.....20	2	3250	3¾x5⅛	36x4k	36x7k	D
White.....40	3½	$4200	3¾x5¾	36x5	40x5d	D
White.....45	5	4500	4¼x5¾	36x6	40x6d	D
White Hick....E	1	1225	3¾x5	34x5n	34x5n	W
White Hick....H	1½	1375	3¾x5	36x3½	36x5	W
White Hick....K	2½	1675	4½x5¼	36x4	36x5	W
Wichita.....K	2	1875	3¾x5¼	36x3½	36x4k	W
Wichita.....M	1	2400	3¾x5¼	36x3½k	36x6k	W
Wichita.....RX	3	3200	4¾x5¾	36x4k	36x8k	W
Wichita.....O	4	$3500	4½x6¼	36x5k	36x5k	W
Wilcox.....AA	1	1900	3¾x5½	36x4k	36x4k	W
Wilcox.....BB	1½	2550	4¼x5	36x4	36x5	W
Wilcox.....D	2½	3000	4¼x5	36x4k	36x3½dk	W
Wilcox.....E	3½	3950	4½x6	36x5k	36x5dk	W
Wilcox.....F	5	4350	4¾x6½	36x5	40x6d	W
Wilson.....F	1½	2270	3¾x5	36x3½	36x5	W
Wilson.....EA	2½	2825	4½x5¼	36x4	36x7	W
Wilson.....G	3½	3685	4½x5½	36x5	36x5	W
Wilson.....H	5	4520	4¾x6	36x6	40x6	W
*Wisconsin.....A	1	1750	3¾x5	34x5n	34x5n	W,B
Wisconsin.....B	1½	2100	3¾x5	35x5	36x6	W
Wisconsin.....C	2½	2700	4 x5¾	36x6n	36x7	W
Wisconsin.....D	3½	3000	4¾x5¾	36x6n	40x8	W
Wisconsin.....E	5	3500	4½x6½	36x6	36x10	W
Wisconsin.....F	7	4000	5 x6¼	36x6	36x12	W
Witt-Will.....N	1½	2450	3¾x5	36x3½k	36x5k	W
Witt-Will.....P	2½	2900	4½x5¼	36x3½k	36x7k	W

FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm. r—8 cyl. s—6 cyl. t—2 cyl.—all others are 4 cyl. d—dual tires. k—pneumatic tires optional at extra cost. n—pneumatic tires. a—price includes several items of equipment, b—price includes body. *—express truck or delivery wagon. **—Canadian Make. trac—tractor.

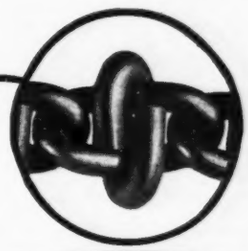
Specifications of Current Farm Tractor Models

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Plow Capacity
Allis-Chal.G.P	6-12	$250	2	LeR.	4-3½x4½	Gas.	1
Allis-Chalm...	15-25	1185	4	Midw.	4-4½x5¼	Gas.	3
Allis-Chalm...	20-35	1885	4	Own	4-4¾x6½	GorK	3-4
‡Allis-Chalm..	20-35	2085	4	Own	4-4¾x6½	G	4
Allwork ...2-G	14-28	1595	4	Own	4-4¾x6	GorK	3
Allwork....C	14-28	1395	4	Own	4-5 x6	GorK	3
¶ARO.1921-22	3-6	385	4	Own	1-4½x5	Gas.	1
Aultman-T....	15-30	1900	4	Clim.	4-5 x6½	G,K	4
Aultman-T....	22-45	2800	4	Own	4-5½x8	G,K	6
Aultman-T....	30-60	4000	4	Own	4-7 x9	G,K,D	8-10
Automot. B-3	12-24	1250	4	Herc.	4-4 x5½	Gas.	2-3
Avery,SR.Cul.	5-10	....	4	Own	4-3 x4	G,K	..
Avery..Cult-C	....	....	3	Own	6-3 x4	G,K	..
Avery.....B	5-10	....	4	Own	4-3 x4	G,K	2
Avery.....C	....	....	4	Own	6-3 x4	G,K	..
Avery.....	8-16	....	4	Own	2-5½x6	G,K,D	2-3
Avery.....	12-20	....	4	Own	4-4½x6	G,K,D	3-4
§Avery.....	....	....	*	Own	4-4x5½	G,K,D	3
Avery.....	12-25	....	4	Own	2-6½x7	G,K,D	3-4
Avery.....	14-28	....	4	Own	4-4⅝	G,K,D	3-4
Avery.....	18-36	....	4	Own	4-5½x6	G,K,D	4-5
Avery.....	25-50	....	4	Own	4-6½x7	G,K,D	5-6
Avery.....	45-65	....	4	Own	4-7¾x8	G,K,D	8-10
Bates Mule..H	15-25	....	4	Midw	4-4½x5¼	Gas.	3
Bates Mule..F	18-25	....	*2	Midw	4-4½x5¼	Gas.	3
‡Bates MuleG	25-35	....	*2	Midw	4-4½x6	Gas.	..
Bear.....	25-35	4253	*2	Ste.	4-4¾x6½	Gas.	4
¶Beeman...G	2-4	240	4	Own	1-3½x4½	Gas.	....
Best.....	30	....	*2	Own	4-4¾x6½	G,K,D	4
Best.....	60	....	*2	Own	4-6½x8½	G,K,D	8-9
Boring.....	5-10	395	4	LeR.	4-3½x4½	G	..
Boring...1921	.....	1850	3	Wauk	4-4¾x5¾	GorK	2
Burn-Oil, 1922	15-30	1395	4	Own	2-6¾x7	Ker.	3-4
Capital.....	15-30	1000	2	Own	4-4¼x6	Gas.	3
Case.....	12-20	1050	4	Own	4-4½x5	G,K,D	3
Case.....	12-20	....	....	....	4-4½x5	....	2
Case.....	15-27	1320	4	Own	4-4½x6	G,K,D	3-4
Case.....	22-40	2550	4	Own	4-5½x6¾	G,K,D	4-5
Case.....	40-72	5200	4	Own	7 x8	G,K,D	8-10
Caterpillar T35	15	....	*2	Own	4-4 x5½	Gas.	3
Caterpillar .5T	25	....	*2	Own	4-4¾x6	Gas.	4
Caterpillar 10T	40	....	*2	Own	4-6½x7	Gas.	6
Centaur.....	5-2½	345	2	N Way	2-4½x4½	GorK	1
Chicago....40	40	2500	4	Own	4-4½x6	Gas.	4
Cletrac.....F	9-16	595	*2	Own	4-3¼x4½	G,K,D	2
Cletrac.....W	12-20	1345	*2	Own	4-4 x5½	G,K,D	2-3
Dakota.....4	15-27	1500	3	Dom.	4-4¾x6	Gas.	3
Depue.....A	20-30	2500	4	Buda	4-4½x6	Gas.	4
Dill.....D	20	2380	4	Cont.	4-4½x5½	Gas.	3
Dill.....R.W.	20	2980	4	Midw.	4-4½x6	Gas.	3
Do-It-All....A	3-6	495	..	Own	1-4½x5	Gas.	1
Eagle.....F	12-22	....	4	Own	2-7 x8	GorK	3-4
Eagle.....H	16-30	....	4	Own	2-8 x8	G or K	4-5
E-B.....AA	12-20	1095	4	Own	4-4¾x5	G,K,D	3
Fageol.....D	9-18	1525	4	Lyc.	4-3½x5	Gas.	2
Farm Horse..B	18-30	1885	4	Clim.	4-5 x6½	G,K	4
Farquhar.....	15-25	....	4	Buda	4-4½x6	G,K,D	3-4
Farquhar.....	18-35	....	4	Own	4-6 x8	G,K,D	4-5
Farquhar.....	25-50	....	4	Own	4-7 x8	G,K,D	6-7
Fitch..4 Drive	20-35	1850	4	Clim.	4-5 x6½	GorK	3-4
Fordson.....	-19	$ 395	4	Own	4-4x5	G,K	2
Franklin....G	18-30	4000	*2	Clim.	4-5 x6½	G or K	3-4
Franklin....C	18-30	3350	*2	Clim.	4-5 x6½	G or K	3 4
Franklin....G2	18-30	4350	2	Clim.	4-5 x6½	G or K	3-4
Frick.....A	12-20	....	4	Erd.	4-4 x6	G,K	2-3
Frick.....C	15-28	....	4	Beav.	4-4¾x6	G,K	3-4
Grain Belt,..A	18-36	2150	4	Wauk.	4-4¾x6¾	G or K	4
Gray.....	20-36	1975	3	Wauk.	4-4½x6¼	Gas.	4
Gray.....	22-44	2165	3	Wauk.	4-5 x6¼	Gas.	4-5
Gt. Western St	20-30	1950	4	Beav.	4-4¾x6	K	4
Hart-Parr..20	20	765	4	Own	2-5¼x6½	K,D.	2
Hart-Parr..30	30	895	4	Own	2-6½x7	K,D.	3
‡Hart-Parr....	....	1695	4	Own	6½x7	K,D.	..
Heider.....D	9-16	870	4	Wauk	4-4¼x6¾	G,K	2
Heider.....C	12-20	995	4	Wauk	4-4½x6¾	G,K	3
Heider ...Cult	5-10	800	4	LeR.	4-3½x4½	Gas.	1
Huber Light 4.	12-25	935	4	Wauk	4-4½x5¾	G or K	3
Huber Super 4	15-30	1885	4	Midw.	4-4½x6	Gas	3
Illinois,.....C	15-30	....	4	Clim.	4-5 x6½	G,K	4
Indiana.....F	5-10	665	2	LeR.	4-3½x4½	Gas.	1-2
International .	8-16	†670	4	Own	4-4¼x5	G,K,D	2
Internatl.Titan	10-20	†700	4	Own	2-6½x8	G,K,D	3
International..	15-30	1750	4	Own	4-5½x8	G,K,D	4
J-T.....N	25-40	3000	*2	Clim.	4-5x6½	G,K,D	3-4
¶Kinkade....	1½	190	1	Own	1-3 x3	Gas.	....
La Crosse.....	12-24	985	2	Own	2-6 x7	G,K	3
Lauson.....5	12-25	1235	4	Midw.	4-4½x5¼	Gas.	3
Lauson.....21	15-30	1675	4	Beav.	4-4¾x6	G or K	3-4
‡Lauson Road	15-30	2000	4	Beav.	4-4¾x6	K	....
Leader.....B	12-18	685	4	Own	2-6 x6¼	G,K,D	2-3
Leader.....N	16-32	1725	4	Clim.	4-5 x6½	G,K	3-4
‡Leader...GU	18-35	2150	*2	Clim.	4-5 x6½	G,K	3-4
Linn.....H4J	40-	4500	*	Cont.	4-4½x5½	Gas	4
Linn.....W	60	5000	*	Wauk	4-5 x6¼	Gas	6
Little Giant,.B	16-22	2200	4	Own	4-4½x5	K	4
Little Giant,.A	26-35	3300	4	Own	4-5½x6	K	6
Lombard..1922	85-150	8950	*2	Wisc.	6-5½x6¾	Gas.	16
Lombard..1922	50	5300	*2	Wisc.	4-4¾x6½	Gas.	8-10
MerryGar1922	2	210	2	Evin	1-2¾x2½	Gas.	..
Minne...All-P	12-25	800	4	Own	4-4½x7	G or K	3
Minne. Gen.P	17-30	1600	4	Own	4-4¾x7	G or K	3-4
Minne. Med.D	22-44	2650	4	Own	4-6 x7	G or K	5-6
MinneHeavyD	35-70	3850	4	Own	4-7½x9	G or K	8-9
Mohawk .1922	8-16	650	2	Light	4-3½x4½	K or G	1-2
Moline Univ D	9-18	650	2	Own	4-3½x5	Gas.	2-3
Moline Orch..	9-18	....	2	Own	4-3½x5	Gas.	2-3
Motor Macult,	1½	195	2	Own	1-2¾x3½	Gas.	..
NB.....1	3-6	425	4	Own	2-3¾x4	Gas.	1
Nichols-Shep.	20-42	2650	4	Own	8 x10	G or K	3-6
Nichols Shep.	25-50	3000	4	Own	9 x12	G or K	4-7
Nichols-Shep.	35-70	3650	4	Own	10½x14	G or K	8-10
Nilson Senior..	20-40	1975	5	Wauk	4-5 x6¼	G,K	4
Oil Pull.....K	12-20	....	4	Own	2-6 x8	K,D	3
Oil Pull.....H	16-30	....	4	Own	2-7 x8½	K,D	4
Oil Pull.....G	20-40	....	4	Own	2-8 x10	K,D	5-6
Oil Pull.....E	30-60	....	4	Own	2-10x12	K,D	8-10
¶Oldsmar ..K	2½-5	$225	4	Own	1-5½x5½	Gas.	1
Peoria.....L	12-25	1600	4	Clim.	4-5 x6½	G,K	3
Pioneer.....G	18-36	1750	4	Own	4-5½x6	G,K,D	4
Pioneer.....C	40-75	3550	4	Own	4-7 x8	Gas.	10
Plowman....A	15-30	1295	4	Buda	4-4½x6	G,K	3-4
Reliable.....	10-20	390	4	Own	2-6 x7	Ker.	2
Rex.....	12-25	1600	4	Wauk	4-4½x5¾	G or K	3
Russell.....	12-24	1500	4	Own	4-4¼x5¾	G or K	2-3
Russell.....	15-30	2200	4	Own	4-5 x6½	G or K	3-4
Russell.....	20-35	3000	4	Own	4-5½x7	G or K	4-5
Russell.....	30-60	5000	4	Own	4-8 x10	G or K	8-10
Samson....M	....	445	4	Own	4-4 x5½	G,K	2
Sandusky,...J	10-20	1250	4	Own	4-4½x5¼	G,K,D	2
Sandusky....E	15-35	1750	4	Own	4-5 x6½	G,K,D	4
¶Shelby.....	1	150	3	B & S	1-2½x2½	G	..
Shelby.....D	15-30	....	4	Beav.	4-4¾x6	G,K	3
Shelby.....C	9-18	....	4	Wauk	4-3¾x5¼	G or K	2
Steady Pull..	12-24	1185	4	Own	4-4 x5	Gas.	3
Tioga.....3	18-32	....	4	Wisc.	4-4½x6	Gas.	3-4
Toro Cultivator	6	750	3	LeR	4-3½x4½	Gas.	2
ToroTractor'22	6-10	495	3	LeR	4-3½x4½	Gas.	2
Townsend.....	10-20	800	2	Own	4-6½x7	Ker.	2-3
Townsend.....	15-30	1350	2	Own	4-7 x8	Ker.	3-4
Townsend.....	25-50	2500	2	Own	4-8½x10	Ker.	4-8
Traction Motor	40-50	....	4	....	8-3½x5	Gas.	4-5
Traylor....TB	6-12	500	4	LeR.	4-3½x4½	Gas.	1-2
Trundaar...1J	25-40	3750	*2	Wauk	4-5 x6¼	G or K	4
Twin City.....	12-20	1200	4	Own	4-4½x6	G,K	3
Twin City.....	20-35	2750	4	Own	4-5½x6¾	G,K	5-6
Twin City.....	40-65	4750	4	Own	4-7¾x9	G,K	8-10
Uncle Sam C20	12-20	1195	4	Weid.	4-4 x5½	G	2-3
Uncle Sam B19	20-30	1985	4	Beav.	4-4¾x6	G or K	3-4
Uncle Sam D21	20-30	1895	4	Beav.	4-4¾x6	G or K	3-4
Utilitor....501	2½-4	295	4	Own	1-3½x4½	G	1
Utilitor...501A	2½-4	340	4	Own	1-3½x4½	G	1
Wallis.....K	15-25	....	4	Own	4-4½x5¾	G,K	3
Waterloo ...N	12-25	675	4	Own	2-6½x7	Ker.	3
Wetmore 21-22	12-25	1185	4	Wauk	4-4 x5¾	G,K	3
Whitney ....D	9-18	595	4	Own	2-5½x6½	Gas.	2
Wichita.....T	15-30	2000	4	Beav.	4-4½x6	G,K,D	3-4
Wisconsin....E	16-30	1850	4	Clim.	4-5 x6½	G or K	3
Wisconsin....F	20-40	2050	4	Wauk	4-5 x6¼	G or K	4
Wisconsin...H	22-40	2550	4	Clim.	4-5½x7	G or K	4-6
Yuba....12-20	12-20	2400	*2	Wisc.	4-4½x6¾	G,K,D	3
Yuba....15-25	15-25	2750	*2	Wisc.	4-4¼x6	G,K,D	..
Yuba....23-35	20-35	3900	*2	Wisc.	4-5¾x7	G,K,D	4
Yuba....25-40	25-40	4250	*2	Wisc.	4-5¾x7	G,K,D	..
‡Yuba.....	25-40	4750	*2	Yuba	4-5¼x7	D	..
Zelle.....	12-25	....	4	Buda	4-4¼x5½	G or K	3

ABBREVIATIONS: G—Gasoline. K—Kerosene. D—Distillate. Plow capacity varies in relation to operating conditions. Figures are based on 14 in. plows. Engine Make; Beav.—Beaver. B & S—Briggs & Stratton. Clim.—Climax. Cont.—Continental. Dom.—Domas Evin.—Evinrude. Herc.—Hercules. LeR.—LeRoy. Midw.—Midwest. Nway.—New Way. Nor.—Northway. Ste.—Stearns. Wauk.—Waukesha. Weid.—Weidely. Wis.—Wisconsin. *—Crawler type. All others are wheel type. †Price includes plows §Track Runner. ‡Industrial Tractor. ¶Garden Tractor.

THE WEED DE LUXE CHAIN

A better chain
plus
A well known name
and
An advertising campaign
creates



WEED

← *Note the reinforcing links for increasing mileage*

A Profit-Producing Product

THE Weed de Luxe Tire Chain is a *better* chain—*better* in every respect—*better* for you as well as your trade. It gives the customer twice as much service and adds to his confidence in the manufacturer and the dealer. Being a *better* chain, it is easier to sell to both old and new customers, increasing the rate of turnover materially.

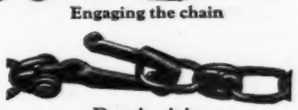
Everyone knows how the old Weed Tire Chain won universal recognition. The steady increase in its use from year to year has made the name "Weed" a by-word for "Safety" amongst motorists until now it enjoys world-wide prestige. What a strong selling argument it is to say now that

the Weed de Luxe Tire Chain is even stronger than the regular Weed, gives twice the mileage, is easier to put on, is made by the same company, and yet costs no more!

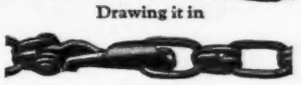
Our national advertising campaign is familiarizing the public with the remarkable features of the Weed de Luxe Tire Chain. In such nation-wide publications as The Saturday Evening Post we spread broadcast the advantages of the Reinforcing Link, the Twin-Loc Side Chain Link, and the Lever Locking Connecting Hook. Many jobbers and dealers report that a great wave of popular response has been aroused.

Be prepared to meet the demand which is sure to arise in your own community. Get in touch with your jobber at once.

Engaging the chain



Drawing it in



Locked

Note how easily they are attached

American Chain Co., Inc., Bridgeport, Conn.

In Canada: DOMINION CHAIN COMPANY, LIMITED, Niagara Falls, Ontario

District Sales Offices: Boston Chicago New York Philadelphia Pittsburgh Portland, Oregon San Francisco

Specifications of Current Passenger Car Models

NAME AND MODEL	Engine Make	Cylinders, Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan
Ace.....F	G-B	4-3½x5	114	32x4	$1295	$1295	....	....	$2295
Ace.....L	H-S	6-3¼x5	117	32x4	2260	2260	....	....	3680
Ace.....C	Cont.	6-3⅝x5¼	123	33x4½	2975	2975	....	....	4500
Ambassador.....R	Cont.	6-3⅝x5¼	136	33x5	....	b1500	$1500	....	6500
American.....C	H-S	6-3¼x5	127	33x4½	b1995	1850	1925	....	2695
Anderson....Aluminum 6	Cont.	6-3½x4¼	114	32x4	....	1195	....	....	....
Anderson.....Series 40	Cont.	6-3¼x4½	120	33x4	2195	1650	1795	$2450	2550
Apperson.....8-21-S	Own.	8-3¼x5	130	34x4½	....	2620	2645	3625	3695
Auburn.....6-51	Cont.	6-3⅜x4½	121	32x4	1575	1575	1615	2275	2395
Auburn.....6-51	Cont.	6-3⅜x4½	121	32x4½	....	n2195	....	....	....
Bay State.....Cont.	Cont.	6-3¼x4½	121	32x4	1800	1800	....	2400	2500
Bell.....4-32	H-S	4-3½x5	114	31x4	1095	1095	....	....	....
Bell.....6-50	H-S	6-3¼x5	124	32x4	1545	1545	....	....	....
Biddle.....B1 & B5	Buda	4-3⅜x5½	121	32x4	2950	b2950	....	3950	3950
Brewster.....91	Own.	4-4 x5½	125	32x4½	5000	5000	....	....	7000
Buick.....1922-31-5-6-7-38	Own.	4-3⅜x4¾	109	31x4	865	885	u725	1175	{1395 {1325c
Buick.....1922-41-4-5-47	Own.	6-3⅜x4½	118	33x4t	1175	1195	u975	1935c	1965
Buick.....1922-48-3-50-4-55	Own.	6-3⅜x4½	124	34x4½	n1625v	n1675v	1435	1895	2195
Cadillac.....61	Own.	8-3½x5¼	132	33x5	3100	3150	3150	b3875	4100
Case.....X	Cont.	6-3⅜x4½	122	32x4½	1750	1790	....	2550	2690
Case.....W	Cont.	6-3⅝x5¼	129	34x4½	....	2200	2250	2850	3250
Chalmers.....1922	Own.	6-3¼x4½	117	32x4	1185	1185	....	1595	2295
Chalmers.....1922	Own.	6-3¼x4½	122	32x4	....	....	1345	....	....
Chandler.....Six	Own.	6-3½x5	123	33x4	1495	b1495	1645	b1995	2295
Chevrolet.....Superior	Own.	4-3½x4	102	30x3½	510	525	u425	{b840 {k680	860
Chevrolet.....FB	Own.	4-3½x5¼	110	32x4	865	885	....	1325	1395
Cleveland.....41	Own.	6-3 x4½	112	32x4	1085	1095	n1260	1495	1585
Cole.....890	Nort.	8-3½x4½	127¼	33x5	2685	b2685n	2685	b3385	3685
Columbia.....DeLuxe	Cont.	6-3⅜x4¼	115	32x4	1475	1475	b1475n	b1925	1995
Columbia.....Light Six	Cont.	6-3⅛x4¼	115	31x4	995	985	....	....	1395
Comet.....C-53	Cont.	6-3½x5¼	125	33x4½	....	1985	2085	....	2985
Crawford.....22-6-60	Cont.	6-3⅝x5½	122½	32x4	3000	3000	3000	....	4500
Crawford-Dagmar...6-60	Cont.	6-3⅝x5¼	135	33x5	....	n3500	....	....	....
Daniels.....D-19	Own.	8-3½x5¼	132	33x5	n4350	b4350	4350	5250	6000
Davis.....71	Cont.	6-3½x4¼	114	31x4	....	1295	....	....	....
Davis.....61-67	Cont.	6-3⅝x4½	120	32x4	1595	1595	b1695	2095	2195
Dixie Flyer.....H-S-70	H-S	4-3½x5	112	32x4	1175	1175	b1295	1545	1595
Dodge Brothers	Own.	4-3⅞x4½	114	32x4	850	880	....	920h	1440
Dorris.....6-80	Own.	6-4 x5	132	33x5	....	b3700	3950	4985b	5750
Dort.....19-14	D-Ly.	4-3½x5	108	31x4	885	885	....	{1265 {1045k	{1385 {1095k
Driggs.....A	Own.	4-2⅝x4½	104	30x3½	1275	1275	....	....	1975
Duesenberg...Straight 8	Own.	8-2⅞x5	134	33x5	6500	6500	6750	7800	7800
Du Pont.....A	Own.	4-3½x5½	124	32x4½	3000	3200	....	3800	4000
Durant.....A-22	Cont.	4-3½x4¼	109	31x4	n890	890	....	1365	1365
Durant.....A...B-22	Anst.	6-3½x4½	123½	32x4½	1600	1650	....	2250	2400
Earl.....40	Own.	4-3½x5¼	112	32x4	1485	1095	950u	b1395	1795
Elcar.....K-4	Lyc.	4-3½x5	118	33x4	1095	1095	n1095	1345	....
Elcar.....7-R	Cont.	6-3¼x4½	118	33x4	1395	1395	n1395	2065	2165
Elgin.....K-1	Falls.	6-3½x4¼	118	33x4	1345	1295	b1345	2195	2195
Essex	Own.	4-3⅝x5	108½	32x4	....	1095	....	1195k	{1895 {1295k
Ford.....T	Own.	4-3⅜x4	100	30x3½	r319	s348	u285	580	645
Franklin.....9-B	Own	6-3½x4	115	32x4	1900	1950	u1750	2750	2850
Gardner.....T-R & G	Lyc.	4-3½x5	112	32x4	895	895	....	1095k	{1595 {1345k
Grant	Own.	6-3⅛x4½	116	32x4	1385	1385	....	1895	1945
Gray	Own.	4-3⅝x4	100	30x3½	....	490	....	....	760
H.C.S.....Series 3	Weid.	4-3⅝x5½	120	32x4½	2400	2400	....	2850	3150
Halladay.....4	Own.	4-3½x5	115	32x4	1095	1095	....	1990	2085
Halladay.....6	Own.	6-3½x5	115	32x4	1595	1595	....	2295	2395
Handley-Knight	Own.	4-4½x4½	125	32x4½	....	....	2650	3450	3450
Hanson.....30	Cont.	6-3½x4¼	114	31x4	....	995	....	....	....
Hanson Six.....60	Cont.	6-3¾x4½	121	32x4	1595	1595	1795	b2475	2585
Hatfield.....A-42	H-S	4-3½x5	115	32x4	....	1315	b1315	1950	1950
Haynes.....75	Own.	6-3½x5½	132	31x4½	2395	b2395	2395	....	3395
Haynes.....55	Own.	6-3½x5	121	32x4½	1545	1495	....	2095	2395
Holmes.....Series 4	Own.	6-3½x4¼	126	31x4½	....	b2500	2500	b3300	3600
Hudson.....Super 6	Own.	6-3½x5	126	34x4½	....	b1645	1695	2570	{2650 {1745k
Huffman	Cont.	6-3⅝x4½	120	32x4	1395	1395	....	....	2295
Hupmobile.....Series R	Own.	4-3¼x5½	112	32x4	1150	1150	u1025	{1635 {1335k	1785
Jackson.....638	Cont.	6-3¼x4½	121	32x4½	....	1485	b1685	2985	2985
Jewett.....Six	Own.	6-3¼x5	112	31x4	a995	995	....	b1445	1465
Jordan.....MX	Own.	6-3⅛x4¾	120	32x4	1895	1795	....	2785	2785
Kenworthy.....8-90	Own.	8-3 x5¼	130	32x4½	5000	5000	5250	6000	6000
King.....K	Own.	8-3 x5	120	32x4½	1795	1795	b1795	2400	2550
Kissel.....45	Own.	6-3⅛x5½	124	32x4½	n2385	1885	2385	b2975	3075
Kline Kar.....6-55-K	Cont.	6-3⅜x4½	121	33x4	1690	1690	1690	2750	2890
LaFayette	Own.	8-3½x5½	132	33x5	3985	b4090	4090	5500	5570
Leach.....999	Own.	6-3¼x5½	134	32x4½	5500	5500	5500	5500	5500
Lexington.....23	Anst.	6-3½x4½	128	32x4½	1695	{1695 {2045n	1795	b2345	2545
Liberty.....10-D	Own.	6-3½x5	117	32x4	1575	1395	1575n	{2085 {1695k	2245

NAME AND MODEL	Engine Make	Cylinders, Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan
Lincoln	Own.	8-3⅜x5	130	33x5	....	....	....	$3900	....
Lincoln	Own.	8-3⅜x5	136	33x5	$3800	b3800	$3800	....	$4900
Locomobile.....48	Own.	6-4½x5½	142	35x5	....	b7600	7600	10500	11000
Moibeam.....B	Own.	6-3½x4½	116	32x4	1395	1395	b1495	2165	2165
Marmon.....34	Own.	6-3¾x5⅛	136	32x4½	3385	b3185	3185	3685	4385
Maxwell	Own.	4-3⅝x4½	109	31x4	885	885	....	1385	1485
McFarlan.....1922	Own.	6-4½x6	140	33x5	6300	b6300	6300	7500	7500
Mercer.....Series 5	Own.	4-3¾x6¾	132	32x4½	3950	b3950	c3950	4850	5250
Merit	Cont.	6-3¼x4½	119	32x4	1895	1895	....	....	....
Mitchell.....F-50	Own.	6-3½x5	120	33x4	a1490	1490	b1690	2050	2275
Mitchell.....F-50	Own.	6-3½x5	127	32x4½	....	....	1690	....	....
Monroe.....1922-S-9	Own.	4-3¼x4½	115	32x3½	950	950	....	....	....
Moon.....6-40	Cont.	6-3⅜x4¼	115	31x4	....	1295	....	....	1695
Moon.....6-58	Cont.	6-3⅝x4½	128	33x4½	1785	1785	1785	2785	2785
Nash.....691-96-97	Own.	6-3½x5	121	33x4	1210	1240	b1395n	....	....
Nash.....692-94-95	Own.	6-3½x5	127	34x4½	....	....	1390	b1890	2190
Nash Four.....41-4	Own.	4-3⅝x5	112	33x4	915	935	....	{a1385 {1195k	{1545 {1275k
National.....BB	Own.	6-3½x5½	130	32x4½	a2475	b2475	2375	b3725	3825
Noma.....3C	Cont.	6-3½x4½	128	32x4½	2000	b2100	c2200	....	3200
Noma.....1D	Bea.	6-3½x5½	128	32x4½	3000	b3100	c3200	....	5500
Norwalk.....430-KS	Lyc.	4-3½x5	116	32x3½	....	1035	....	....	....
Oakland.....6-44	Own.	6-2½x4¾	115	32x4	975	{995 {u795	b1165n	{b1445 {1185k	1545
Ogren.....6 T De Luxe	Cont.	6-3⅝x5½	134	33x5	b3750	3750	3850	4500	4800
Oldsmobile.....43-A	Own.	4-3½x5½	115	32x4	1145	1145	b1265	1645	1795
Oldsmobile.....46	Own.	8-2⅞x4¾	122	33x4½	....	b1735	1735	....	2635
Oldsmobile.....47	Own.	8-2⅞x4½	115	32x4	1595	b1595	2145	b3725	2295
Overland.....4	Own.	4-3⅜x4	100	30x3½	550	550	....	850	895
Packard.....Single-Six	Own.	6-3⅜x5	126	33x4½	2485	2485	u2250	3175	3275
Packard.....Single-Six	Own.	6-3⅜x5	133	33x4½	....	u2350	2685	....	3525
Packard.....Twin Six	Own.	12-3 x5	136	35x5	3850	3850	3850	5240	5400
Paige.....6-44	Own.	6-3½x5	119	32x4	1465	1465	u1290	1995	2245
Paige.....6-66	Cont.	6-3⅜x5	131	33x4½	a2495	n2245	2195	3100	3155
Paterson.....22-6-52	Cont.	6-3⅜x4½	120	32x4½	....	1550	1585	2595	2595
Peerless.....56-S-7	Own.	8-3½x5	125	34x4½	....	b2790	2790	3500	3790
Pierce-Arrow	Own.	6-4 x5½	138	33x5	5250	b5250	5250	6800	7000
Pilot.....6-50	H-S	6-3½x5	126	32x4½	2050	2000	2050	2950	3000
Premier.....6-D	Own.	6-3⅜x5½	126¾	33x5	3150	b3100	3250	4300	5100
Premocar.....6-40-A	Falls.	6-3⅛x4¼	117	32x4	1095	1095	....	1750	1825
R & V Knight.....R	Own.	4-3⅜x5	116	32x4	....	1665	....	2385	2475
R & V Knight.....J	Own.	6-3½x4½	127	32x4½	2475	b2475	2475	3015	3105
Reo Series.....T6 & U6	Own.	6-3⅞x5	120	33x4	1595	n1645	1485	2355	2435
ReVere.....C	Dues.	4-4¼x6	131	32x4½	3200	3200	3200	....	4000
Rickenbacker.....A	Own.	6-3½x4¾	117	32x4	....	1485	....	1885	1985
Roamer.....6-54-E	Cont.	6-3½x5¼	128	32x4½	2850	b2585	2785	3850	3850
Roamer.....4-75-E	Dues.	4-4¼x6	128	32x4½	3985	b3585	b3750n	....	b4650
Rolls-Royce	Own.	6-4½x4¾	143½	33x5	....	10,900	....	....	....
Saxon.....125	Own.	4-3½x5	112	32x4	1195	1195	....	1795	1795
Sayers Six.....DP	Cont.	6-3¼x4½	118	33x4	1645	1645	....	2645	2645
Seneca.....L-2 & O-2	Lyc.	4-3½x5	108	30x3½	875	875	....	....	....
Seneca.....50 & 51	Lyc.	4-3½x5	112	31x4	1095	1095	....	....	....
Sperling.....A	Supr.	4-3⅜x5	114	32x4	980	980	....	1685	1685
Standard.....98	Own.	8-3¼x5	127	34x4½	2150	b2500	2500	2750	3200
Stanley	Own.	2-4 x5	130	32x4½	2700	2700	2700	3775	3950
Stanwood Six	Cont.	6-3¼x4½	118	33x4	1765	1765	....	2750	....
Star	Cont.	4-3½x4¼	102	30x3½	r319	s348	u285	580	645
Stearns-Knight....SKL4	Own.	4-3⅜x5½	125	34x4½	2250	2250	2450	3150	3450
Stearns-Knight.....6	Own.	6-3⅜x5	130	34x4½	2700	2700	2850	3350	3700
Stephens.....90	Own.	6-3¼x4½	122	33x4½	1575	b1595	c1625	2450	2550
Stevens-Duryea.....E	Own.	6-4¼x5½	138	35x5	7250	b6900	6800	u5600	b8900
Studebaker....Light Six	Own.	6-3½x4½	112	32x4	975	975	u785	1225	1550
Studebaker...Special Six	Own.	6-3½x5	119	32x4	1250	1275	b1275	1875	2050
Studebaker.....Big Six	Own.	6-3⅞x5	126	33x4½	u1300	1650	n1785	2275	2475
Stutz	Own.	4-4⅜x6	130	32x4½	2950	b2990	c2990	3990	4450
Templar.....A-445	Own.	4-3⅜x5½	118	32x4	2025	2125	b2175	2785	2785
Tulsa.....E-1-2-3	H-S	4-3½x5	117	33x4	1175	1175	....	....	....
Velie.....48	Cont.	6-3¼x4½	115	32x4	1585	1585	b1800	2485	2485
Velie.....34	Falls.	6-3½x4½	112	32x3½	1235	1235	....	1750	2085
Velie.....58	Own.	6-3½x4¼	115	32x4	1275	1275	....	2185	2185
Washington.....C	Cont.	6-3⅜x4½	120	32x4	....	1785	....	....	2285
Westcott.....C-48	Cont.	6-3½x5½	125	32x4½	....	....	1890	....	2890
Westcott.....A-44	Cont.	6-3¼x4½	120	32x4	....	....	1690	n1890	....	2690
Wills Sainte Claire..A-68	Own.	8-3¼x4	121	32x4½	2475	2475	....	3275	3475
Willys-Knight.....20	Own.	4-3⅜x4½	118	32x4	1350	1375	....	1875	2095
Winton.....40	Own.	6-3¾x5¼	132	35x5	3400	n3600	3400	b4450	4550

a—3-passenger. b—4-passenger. c—6-passenger. n—Sport. h—All Metal Type. k—Soft Top Type. u—Chassis Price. r—Price without starter and demountable rims. Price with starter and demountable rims $414. s—Price without starter and demountable rims. Price with starter and demountable rims $443. t—Model 47—34x4½ Tires. v—Tire Sizes 32x4½. e—Touring Sedan.

Engine Make: Anst—Ansted. Bea—Beaver. Cont—Continental. Curt—Curtis. D.Ly—Dort Lycoming. G-B—Grey Beal. H-S—Herscaell-Spillman. Lyc—Lycoming. Nort—Northway. Roch—Rochester. Rut—Rutenberg. Supr—Supreme. Weid—Weidely. Wisc—Wisconsin.

The following price changes have been announced since the table was compiled:

AUBURN

5 passenger Phaeton	1,475
5 passenger Sport	1,995
7 passenger Phaeton	1,545

MITCHELL

Roadster	$1,750
Sport	1,850
5 passenger Phaeton	1,750
7 passenger Phaeton	1,850
Coupe	2,325
Sedan	2,525

STUTZ

Roadster	2,450
6 passenger Phaeton	2,640
4 passenger Phaeton	2,790
Coupe	3,490

NOMA

Model C Roadster	2,500
4 passenger	2,500
6 passenger Phaeton	2,600